

STANDARD SPECIFICATIONS FOR HOUSE FRAMING



*a complete manual of
frame erection for home builders
using*

WEYERHAEUSER

4 SQUARE Guide Line FRAMING

4-SQUARE Guide-Line FRAMING



Weyerhaeuser 4-SQUARE Guide-Line FRAMING, the new precision lumber improved with eleven practical plus values, is manufactured in five American Lumber Standard dimensions—2x4, 2x6, 2x8, 2x10, 2x12—each size in standard lengths from 8 to 20 feet.

Other improved lumber products in the 4-SQUARE line, not shown here, come in labeled packages. They include Bevel Siding, Colonial Siding, Inch and Thick Finish, Inch and Thick Common, Drop Siding, Stepping, Flooring, Ceiling; and Mouldings in full length cartons.

WEYERHAEUSER SALES COMPANY

4-SQUARE Guide-Line FRAMING and Other Building Materials

LUMBER PRODUCTS INCLUDE WEYERHAEUSER 4-SQUARE LUMBER, WEYERHAEUSER STANDARD LUMBER, WEYERHAEUSER LABORATORY-DESIGNED AND CUT-TO-SIZE CRATING, WEYERHAEUSER POLES AND PILING. INSULATION PRODUCTS INCLUDE BALSAM-WOOL BLANKET, THE TRUE BUILDING INSULATION, AND NU-WOOD, THE ALL-WOOD INSULATING BOARD AND LATH

GENERAL OFFICES, First National Bank Building, ST. PAUL, MINN.

MINNEAPOLIS 808 Foshay Tower	CHICAGO 307 N. Michigan Ave.	KANSAS CITY 1417 R. A. Long Bldg.	TOLEDO 2001 2nd Nat'l Bank Bldg.	PITTSBURGH 2401 1st Nat'l Bank Bldg.
PHILADELPHIA 1600 Arch Street	NEW YORK 3107 Chanin Bldg.	SAN FRANCISCO 149 California St.	SPOKANE Old Nat'l Bank Bldg.	

Weyerhaeuser 4-SQUARE Guide-Line FRAMING and 4-SQUARE Finishing Lumber are sold at retail by Authorized 4-SQUARE Lumber Dealers, from Coast to Coast

Precision Lumber

4-SQUARE Precision Lumber, and particularly 4-SQUARE Guide-Line FRAMING, is the first attempt to bring precision to lumber in the interests of good construction.

Compared with ordinary framing lumber, 4-SQUARE Guide-Line FRAMING is quite revolutionary in its economic scope. Produced on special machines from selected, seasoned stock, this new lumber has functional improvements which promote accuracy of construction and ease of use. It has been placed on the market at a surprisingly reasonable cost when its quality and inherent advantages are considered.

A Weyerhaeuser Product

4-SQUARE Lumber for Good Construction is made by Weyerhaeuser, the world's largest manufacturer of home building materials. The organization which has pioneered almost every important improvement in lumber manufacture, in scientific logging, in forest conservation and utilization. Owner and operator of 20 lumber mills, 4 central distributing plants, 923 miles of standard gage railroad, 4 steamships for lumber transportation to Eastern markets. This organization has been known for years in the profession as among the most progressive in fostering good design and good construction.

Outstanding Advantages

4-SQUARE Guide-Line FRAMING possesses *Eleven Plus Values*, practical advantages which make it a precision product, easier to use with greater assurance of permanent good construction.

1. Squared Ends—Both ends of every piece of 4-SQUARE Guide-Line FRAMING are machine-trimmed precisely square, automatically providing full bearing surfaces and snug, tight joints. Ordinary framing lumber is not squared on the ends and must be trimmed by hand on the job.

2. Exact Standard Lengths—Every piece is cut to precise standard length. A 14-foot joist, for example, is 14 full 12-inch feet in length. Ordinary framing lumber is seldom exact standard length. Frequently it is over-length, requiring hand-trimming. Too often it is scant.

3. Calibrated Every Inch with Guide Lines—A revolutionary innovation in lumber are these accurate guides pressed into the face of every piece of 4-SQUARE Framing. They serve as valuable time-saving, trouble-saving aids to precision in placing, measuring, fitting and leveling of framing members.

4. Seasoned Stock—The words, "Seasoned Stock," printed on every piece of 4-SQUARE Framing, are Weyerhaeuser's assurance that this precision lumber is ready and fit for immediate use in good construction. Ordinary framing lumber may or may not be seasoned. Too much of it is "green"—totally unfit for use in good construction.

5. Chamfered Edges—The instant you handle a piece of



4-SQUARE Framing you know it is unlike any lumber you ever handled before. All four edges of each piece are chamfered. No sharp edges. Easier to handle.

6. Better Appearance—Never before have you seen structural lumber that *looks* like the precision building material this improved Framing *is*. Properly surfaced on four sides after seasoning it is clean, bright, good-looking stock.

7. Marked for Species—The full species name, printed on each piece, is positive protection against substitution. Ordinary framing lumber is seldom species-marked.

8. Marked for Grade—The full grade name, printed on each piece, is positive proof that the quality specified and paid for is the quality delivered.

9. Trade-Marked—Every piece of 4-SQUARE Guide-Line FRAMING bears the nationally advertised Weyerhaeuser 4-SQUARE trade mark, for quick identification and protection to the buyer.

10. Sold Only by Authorized 4-SQUARE Dealers—The 4-SQUARE Franchise Sign is displayed only by selected lumber merchants who have proved their reliability and their knowledge of good lumber and its uses.

11. Guaranteed by Weyerhaeuser—All the specific precision advantages claimed for 4-SQUARE Guide-Line FRAMING are verified by the words, "Weyerhaeuser Guaranteed," printed on each piece.

An Architectural Product

Each piece of 4-SQUARE Guide-Line FRAMING is distinctly marked for identification as to "Species" and "Grade" and the fact that it is "Seasoned Stock" all backed by the guarantee and the trade mark of a responsible producer.

Thus, for the first time, the architect is in a position to specify definitely a lumber product with the full assurance that when 4-SQUARE Guide-Line FRAMING is named, the lumber delivered will fulfill in every respect his specification requirements.

Not only is the architect assured of the quality of the product specified, but the lumber has such definite elements of economy (apparent to anyone familiar with the use of ordinary lumber) that the architect is fully justified in its specific selection.

The Standard Specifications for House Framing

While many national organizations have in the past furnished standard details of wood framing, there has hitherto never existed a well organized, complete standard specification to supplement these accepted standard details.

For the convenience of the architect there is included in this manual such a specification. Its provisions are based on standard national good practice and may be regarded as containing all the elements needed to assure good sound construction based on the use of 4-SQUARE Guide-Line FRAMING.

STANDARD DETAILS FOR HOUSE FRAMING

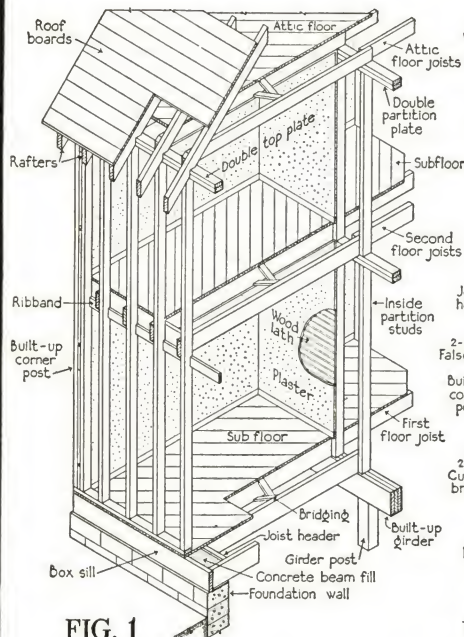


FIG. 1

THE BALLOON FRAME

This type of frame has many things to recommend it. The one piece studs, extending the full height of the wall and tied together by the ribband at the second floor line reduce to a minimum the shrinkage factor. It is strong and rigid but requires careful fire stopping.

This frame is more efficient when the interior studding is set directly on top of girders or bearing partitions.

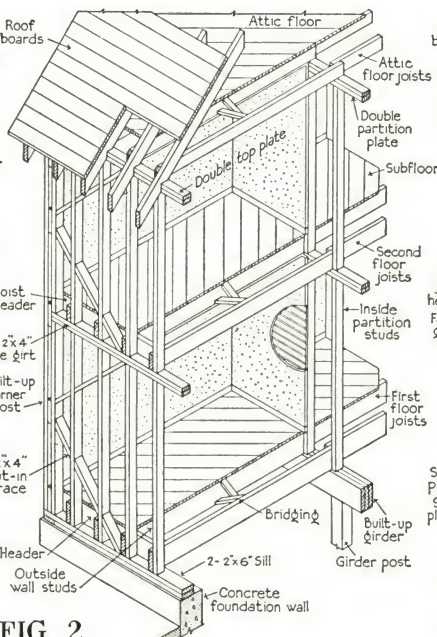


FIG. 2

THE MODERN BRACED FRAME

This type of frame is an outgrowth of New England solid timber post and girth construction. Built-up members are used today very largely and with equal satisfaction. Instead of heavy posts set eight or ten feet apart, walls are built with 2x4 in. studs set 16 in. on centers. The second floor is carried on a double 2x4 in. girth. Diagonal bracing is inserted at the corners. This type has several commendable features. It is simple to build and has good provision for fire stopping both at sill and second floor line. 2x4 in. cut-in bracing, as illustrated, may also be used with other types.

THE FRAME provides the network to which the other materials are fastened and the strength and rigidity required to support the loads put upon it and preserve the materials with which it is built. Three distinct types of frames are shown by Figs. 1, 2 and 3. Numerous combinations of these types are frequently employed.

BALANCED SHRINKAGE

The total thickness of horizontal lumber in the framing of outside and inside walls on each floor should be equalized as nearly as possible to eliminate uneven shrinkage.

FIRE STOPPING

Fire safety in a dwelling is increased by preventing the circulation of air in the walls between floors or between rooms. An effective method is shown in the drawing to the right. (Fig 5)

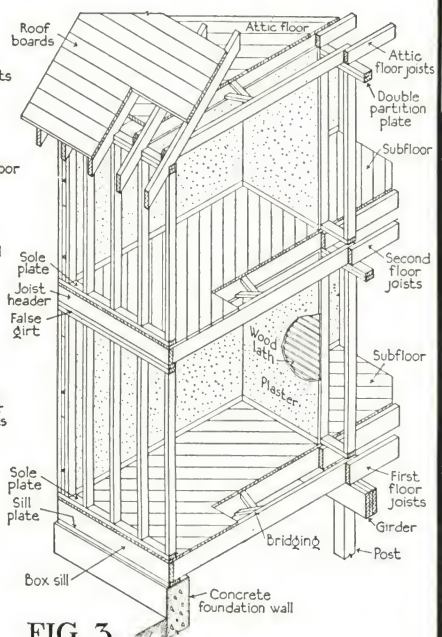


FIG. 3

THE PLATFORM FRAME

The Platform Frame is extensively used. It is similar in principle to Braced Frame but has boxed sill construction at each floor line. This makes for greater shrinkage but it is equalized on each floor when a similar type of construction is used under bearing partitions.

This frame is more efficient when the interior studding is set directly on top of girders or bearing partitions.

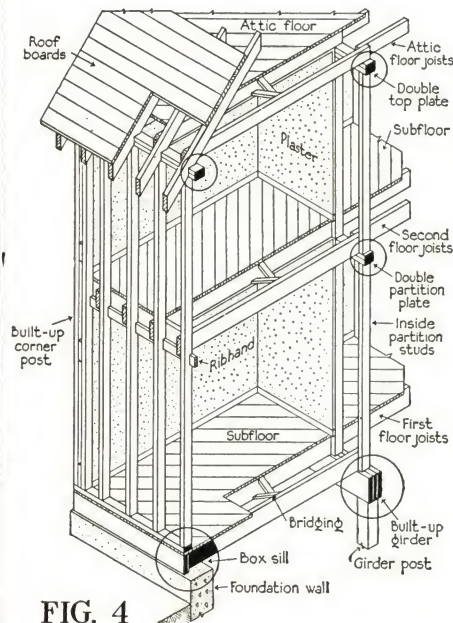


FIG. 4

DETAIL OF METHOD FOR SECURING BALANCED SHRINKAGE

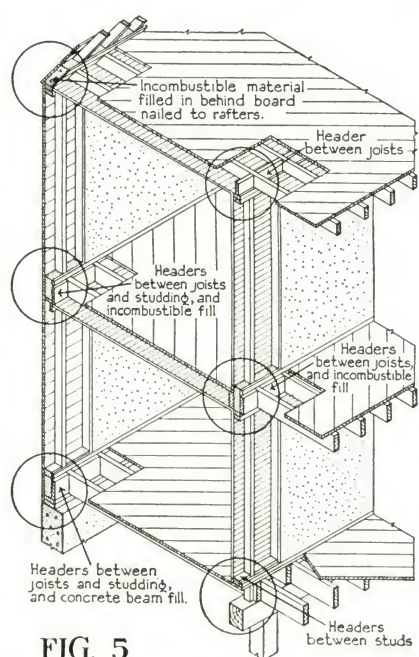


FIG. 5

FRAMING FOR FIRE STOPPING

MASTER SPECIFICATIONS

PREFACE

Scope

The scope of these specifications is confined to the erection of the rough structural frame above masonry footings and foundations, joists are covered with sub-flooring; and exterior walls are sheathed and the roofs boarded and the whole protected with waterproof building paper.

Window and door frames and exterior mill trim, siding, shingles, etc., are not included.

Details Required

Though customarily not furnished, certain of the illustrative drawings used in conjunction with this specification are obviously necessary and should be included among the details of the building if the full intent of the specifications is to be conscientiously carried out.

Specification Form

The form of this specification is that of a "Master" which includes all clauses which in ordinary practice apply to average work. All clauses, obviously do not apply to every building. In formulating the "Rough Framing and Carpentry Specifications" for a particular building, only those clauses which apply should be selected for inclusion. Special provisions or methods but seldom required are not included—such clauses should be added wherever necessary to define the procedure clearly and especially to obviate controversy involving responsibility and cost.

Notes

Notes in italics are explanatory or advisory only and should not be included in the specification.

Selective Words or Phrases

Wherever words or phrases occur in the body of the specification paragraph printed in italics and enclosed in parentheses, choose that word or phrase which applies to the particular work, omitting those that are irrelevant. Wherever the word "specify" occurs in italics enclosed in parentheses, thus (*specify*), add the particular word or clause applicable, optional with the specification writer.

Local Ordinances

These specifications are based upon the recommendations of the National Committee on Wood Utilization, United States Department of Commerce; the National Lumber Manufacturer's Association and other national bodies. Engineering data are based upon the findings of the United States Department of Agriculture, Forest Products Laboratory.

Due to lack of universal adoption of nationally accepted standards, the specifications should be correlated with the requirements of Local Ordinances relating to this division of the work.

Alterations and Additions

These specifications cover new work only. For additions and alterations add such clauses covering repairs and replacements and the joining of old and new work as may be required.

Advisory Service

The technical staff of Weyerhaeuser Forest Products is at all times accessible for advice and recommendations in the formulating of the specification for "Rough Framing and Carpentry."

ROUGH FRAMING AND CARPENTRY

(1) General Conditions

The General Conditions governing the General Contract apply to the work under this division.

Note: The American Institute of Architects' standard form of General Conditions is advocated.

(2) Work Included

The work included under this heading is all of the rough structural wood framing as shown upon the drawings and details and herein specifically mentioned.

Note: Amplify or amend as required for the particular work, and especially in the case of alterations and additions.

(3) Preliminary Provisions

Note: Provide for the following under other specification divisions when and where they apply.

(3a) Footings, Foundations, Etc.—

(3a1) *Footings*—All footings shall be set well below the frostline and rest on firm soil. They shall be made of a good grade of concrete and be allowed to season thoroughly before starting the framework or masonry foundation.

(3a2) *Bearing Surfaces*—Bearing surfaces shall be flat and horizontal, and have an area equal to:

1 sq. ft. for every 4 tons of weight for coarse sand, gravel or hard clay.

1 sq. ft. for every 3 tons of weight for dry clay and fine sand.

1 sq. ft. for every 2 tons of weight for ordinary sand or clay.

1 sq. ft. for every 1 ton of weight for wet, soft clay or loam.

(3a3) *Column Footings*—Footings for columns shall be square and the base shall have a depth equal to one-half the length or width and the top shall set high enough to support the columns at least 3 in. above finished basement floor.

Note: See Fig. 6, page 6.

(3a4) *Wall Footings*—Footings for walls shall be at least 12 in. wider than thickness of foundation wall and at least 8 in. deep.

Note: See Fig. 7, page 6.

(3a5) *Chimney Footings*—Footings under chimneys shall be not less than 12 in. deep.

(3a6) *Basement Stud Partition Footings*—Provide concrete footings under all stud basement bearing partitions. Footings shall extend 3 in. above the basement floor forming a concrete base carefully troweled smooth which shall be at least the width of the finished partition. For non-bearing partitions form a similar base of concrete when the finished concrete floor is laid.

(3a7) *Foundation Walls*—Foundation walls shall be at least 12 in. thick. Materials for foundations shall be a good grade of concrete, approved concrete blocks, hard brick, hollow load bearing tile, stone masonry or other approved impervious material adapted to local soil conditions. The top of the foundation walls shall be leveled-up so as to furnish uniform bearing for framing.

(3a8) *Drainage*—Tile drainage, level with the footings shall be provided on up-hill side of walls and on all other sides where ground water is apt to collect.

(3b) Dampproofing—

Note: Moisture is necessary for the growth of fungi, the most common cause of wood decay. Proper dampproofing at all points of juncture between masonry (usually prone to capillarity) and wood should obviously be provided.

STANDARD DETAILS FOR HOUSE FRAMING

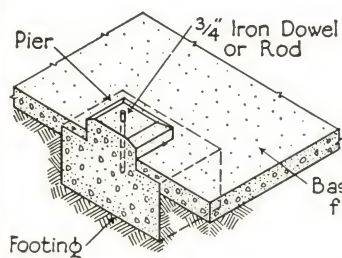


FIG. 6 FOOTING FOR COLUMN

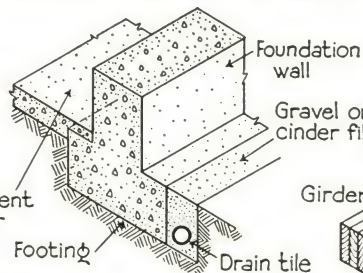


FIG. 7 FOOTING FOR FOUNDATION WALL

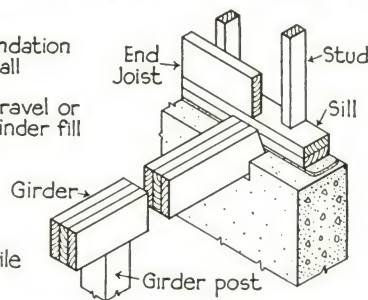


FIG. 8 BUILT-UP GIRDER - END SET IN CONCRETE WALL

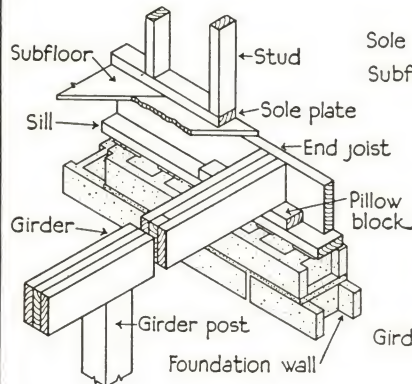
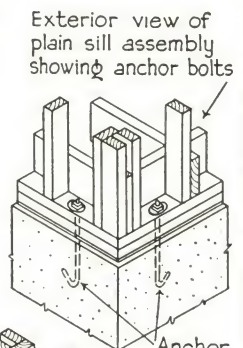


FIG. 9 BUILT-UP GIRDER END SET ON SILL PLATE

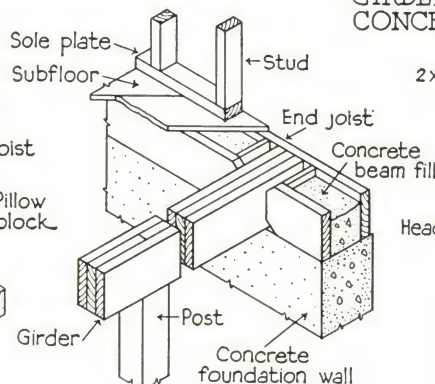


FIG. 10 BUILT-UP GIRDER END SET ON CONCRETE WALL

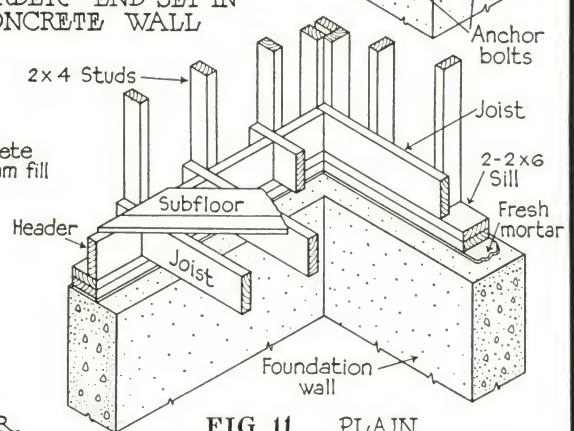


FIG. 11 PLAIN SILL ASSEMBLY

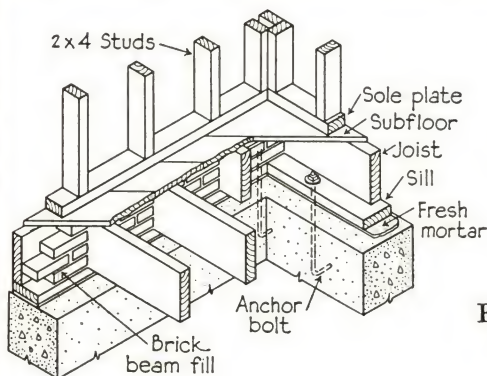


FIG. 12 BOX SILL ASSEMBLY WITH SILL PLATE

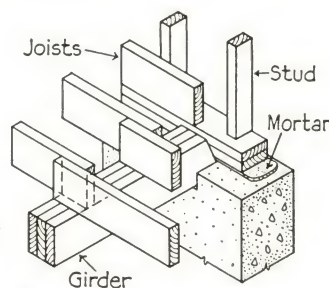


FIG. 14 FRAMING JOIST ON TOP OF GIRDER

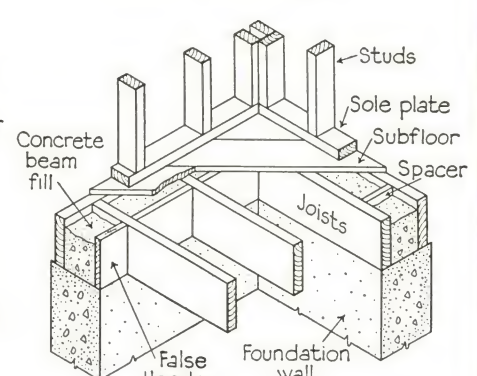


FIG. 13 BOX SILL ASSEMBLY WITHOUT SILL PLATE

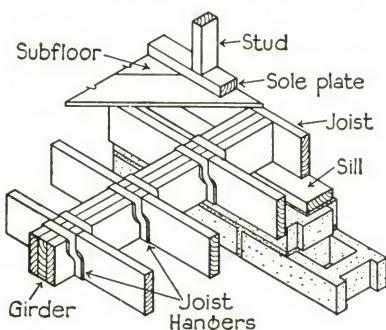


FIG. 15 FRAMING JOIST LEVEL WITH TOP OF GIRDER

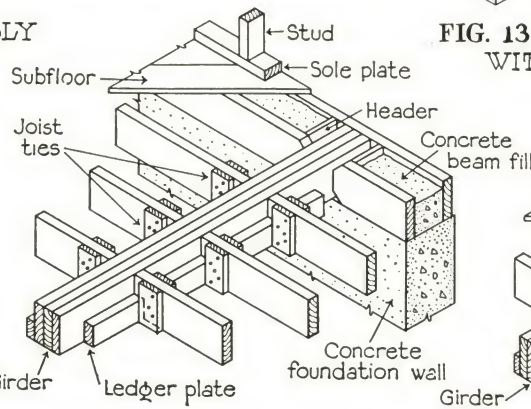


FIG. 16 FRAMING JOIST NOTCHED OVER LEDGER STRIP

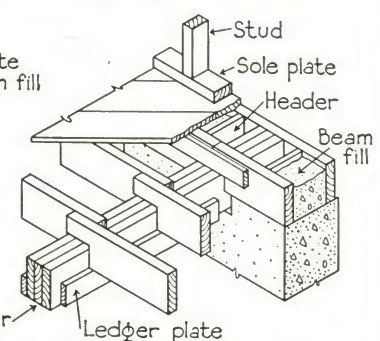


FIG. 17 FRAMING JOIST NOTCHED OVER GIRDER

Provide integrally waterproofed mortar or concrete at all points of contact between masonry and wood or dampproof the masonry at these points with a coating of dampproof paint.

(3c) Dowels, Anchors, Etc.—

(3c1) Post or Column Dowels—Provide steel anchor dowels for all wood posts or columns, $\frac{3}{4}$ in. in diameter, set 12 in. in concrete footings and extending 2 in. into hole bored in bottom of columns. Accurately center dowels in footings.

Note: See Fig. 6, page 6.

(3c2) Sill Anchors—Furnish and install, accurately located (as detailed), $\frac{3}{4}$ in. diameter steel hook bolts to anchor all (sills) (sill plates) to masonry walls. Anchors shall be set from 16 in. to 20 in. in the masonry work and not more than 8 ft. apart between stud locations with one anchor on each side of all corners. They shall project a sufficient height above top of masonry to pass through the sill and take large nuts and washers.

Note: See Figs. 11 and 12, page 6, for details.

(3d) Lumber Treatment—

Note: In localities subject to termite depredation or at points of construction exposed to fungi growth, the chemical treatment of lumber and particularly that coming in contact with masonry foundations may be necessary. Recommendations to suit the particular locality best may be obtained from the Weyerhaeuser Technical Staff.

(4) Materials and Dimensions

(4a) General—Where so specified, all material for the structural wood frame shall be "4-SQUARE Guide-Line FRAMING" as marketed exclusively by Weyerhaeuser Sales Co., St. Paul, Minnesota, or equivalent, meeting fully the following specifications:

No. 1 common grade, seasoned stock; surfaced four sides to American Lumber Standard sizes; trimmed square and true at both ends to exact full lengths; fully identified and guaranteed as to grade, species and seasoning.

Note: "4-SQUARE Guide-Line FRAMING" is made from No. 1 common grade, S4S. Therefore in the specifications under sub-headings "Grade and Species," only the one designation is necessary.

Solid timber and other grades and sizes not specified to be "4-SQUARE Guide-Line FRAMING" shall be in accordance with the rules of the Association of Lumber Manufacturers covering the region in which it is produced.

(4b) Abbreviations—Wherever the following trade abbreviations occur, they shall be interpreted as follows:

S4S—Surfaced four (4) sides.

S1S1E—Surfaced one (1) side and one (1) edge.

(4c) Finished Dimensions—All sizes specified are nominal and shall be interpreted as the Standard Commercial Size established by the Lumber Association covering the region in which the lumber was produced.

Note: See "Standard Sizes of Lumber," page 17.

(4d) Wood Posts or Columns—

(4d1) Grade and Species—Solid timber, No. 1 Common Grade of Douglas Fir, S4S.

(4d2) Dimensions—Sizes marked on plans.

Note: Posts should be preferably square, and in any case not smaller than 4x6 in. Provide full bearing for width of girder supported. Height should not be greater than 50 times its least dimension. Posts 6x6 in. or less over which girder is spliced or butt-jointed should be provided with ribbed cast iron caps. Posts supporting wood girders should not be spaced more than 10 ft. apart. See data for determining size of posts, page 17.

(4e) Wood Girders—

Note: Wood girders may be built-up or solid. While either type may be used, built-up girders are preferable because of greater strength, size for size; less shrinkage due to complete seasoning possible in thinner stock; and greater ease of installation. Members of built-up girder should be nailed together securely. See data for figuring girder sizes, page 17.

(4e1) Grade and Species—

(a) Built-up Girders, "4-SQUARE Guide-Line FRAMING" Douglas Fir.

(b) Solid Girders, No. 1 Common Grade of Douglas Fir (S4S) (S1S1E).

(4e2) Dimensions—Sizes marked on plans.

(4f) Sills—

Note: For types of sills, see Figs. 11, 12, and 13, page 6.

(4f1) Grade and Species—"4-SQUARE Guide-Line FRAMING" Douglas Fir (or No. 2 common Douglas Fir, S4S or S1S1E except for Box Sill).

(4f2) Dimensions—

(a) Plate Sills, 2x6 in. under 2x4 in. studding; 2x8 in. under 2x6 in. studding as designated on plans.

(b) Box Sills, same dimensions as designated on plans for joists.

(4g) Joists—

(4g1) Grade and Species—"4-SQUARE Guide-Line FRAMING" (Douglas Fir) (West Coast Hemlock).

Note: Select to suit local market conditions.

(4g2) Dimensions and Spacing—Sizes and spacing marked on plans.

Note: Joists should be spaced normally 16 in. o. c. except where additional strength is required for some particular floor area, in which case the joists should be doubled or extra joists set between the regular joists so as not to interfere with lathing. 12 in. o. c. spacing will also conform to lathing requirements.

See data for determining size of joists, page 18.

(4h) Rafters—

(4h1) Grade and Species—"4-SQUARE Guide-Line FRAMING" (Douglas Fir) (West Coast Hemlock).

(4h2) Dimensions and Spacing—Sizes and spacing marked on plans.

All ridge, hip and valley rafters shall be at least 2 in. wider than the regular rafters. The ridge rafter may be of 1 in. material, but the hip and valley rafters shall be 2 in. thick.

Note: Rafters should be spaced normally 16 in. o. c., since this permits setting the rafters directly over the wall studs and permits nailing each one to the side of the ceiling joist, thus tying the frame together and prevent spreading of the wall. Also, this spacing facilitates lathing in case underside of rafters is to be plastered. See data for determining size of rafters, page 19.

(4i) Bridging—

(4i1) Grade and Species—Cut from sound boards of grade and species hereinafter specified for sheathing.

(4i2) Size—(1x3 in.) (1x4 in.) (2x2 in.) accurately beveled at ends to fit tightly against the face of joists.

(4j) Stair Strings or Carriages—

(4j1) Grade and Species—"4-SQUARE Guide-Line FRAMING" (Douglas Fir) (West Coast Hemlock).

(4j2) Dimensions—

Note: Select to suit local market conditions.

(a) Strings shall be 2 in. thick by such a width that when the rough riser and tread support is cut out the minimum dimension remaining shall not be less than (3 $\frac{5}{8}$ in.) (5 $\frac{1}{8}$ in.) (specify).

(b) Carriages shall be (4x6 in.) (specify) built up of 2 in. thicknesses.

(4k) Studs, Soles and Plates—

(4k1) Grade and Species—"4-SQUARE Guide-Line FRAMING" (Douglas Fir) (West Coast Hemlock).

Note: Select to suit local market conditions.

(4k2) Dimensions and Spacing—2x4 in. (other widths where so designated) studs spaced 16 in. o. c. (12 in. o. c. where so designated).

Note: On exterior walls for one or two story houses the outside studs are customarily 2x4 in. In buildings over two stories and in cases of exceptionally high ceilings, studs should be 2x6 in. or larger.

Basement bearing partitions should be framed with 2x4 in. studs and spaced 16 in. o. c. except where they support more than one floor, in which case they should be framed with 2x4 in. studs spaced 12 in. o. c. or 2x6 in. studs spaced 16 in. o. c.

All partitions above the basement should be framed with 2x4 in. studs spaced 16 in. o. c. (12 in. where so designated), except where thicker walls are required on the larger work for structural purposes or to conceal plumbing and heating pipes, vents, etc., or to provide for architectural effects.

(4l) Ribbands—

(4l1) *Grade and Species*—Same as hereinafter specified for "Wall Sheathing."

(4l2) *Dimensions*—(1x4 in.) (1x6 in.) S4S.

(4m) Diagonal Let-in Bracing—

(4m1) *Grade and Species*—Same as hereinafter specified for "Wall Sheathing."

(4m2) *Dimensions*—1x4 in. S4S.

(4n) Diagonal Cut-in Bracing—

(4n1) *Grade and Species*—Same as hereinbefore specified for "Studs, soles and plates."

(4n2) *Dimensions*—Same as exterior studding.

(4o) Sub-Flooring—

Note: The grades, species, size, etc., of this type of lumber are numerous and must be selected to suit local stocks. Select from one of the following.

(4o1) Grades and Species—

(a) No. 3 Common or better grade of (*Genuine White Pine*) (*Ponderosa Pine*) (*Spruce*) (*White Fir*) (*Fir and Larch*) (*Western Red Cedar*) in accordance with the grading rules of Northern Pine Manufacturers' Association, Western Pine Manufacturers' Association, California White and Sugar Pine Manufacturers' Association, or Western Pine Association as they apply.

Note: Grade of No. 4 Common is permissible provided large and coarse defects that will weaken the boards materially are cut out.

(b) No. 1 Common Grade of (*Douglas Fir*) (*West Coast Hemlock*) (*Western Red Cedar*) in accordance with the grading rules of West Coast Lumbermen's Association.

Note: Grade of No. 2 Common is permissible provided large and coarse defects that will weaken the boards materially are cut out.

(4o2) *Dimensions*—(*Square-edged*) (*Shiplapped*) (*Dressed and matched*) (*Dressed and matched and end matched*) 1 in. nominal thickness surfaced to $\frac{3}{4}$ in. or thicker and uniform width of (4 in.) (6 in.) (8 in.) (10 in.) (12 in.).

Note: Square edged material may be used, although shiplapped or dressed and matched, is recommended due to its greater strength, warmth and soundproofness. Select to suit local market conditions. Stock dressed and matched and end matched is not recommended in widths exceeding 8 in.

(4p) Wall Sheathing—

(4p1) *Grade and Species*—Same as specified hereinbefore for "Sub-flooring."

(4p2) *Dimensions*—(*Shiplapped*) (*Dressed and matched*) (*Dressed and matched and end matched*) 1 in. nominal thickness surfaced to $\frac{3}{4}$ in. or thicker and uniform width of (4 in.) (6 in.) (8 in.) (10 in.) (12 in.).

Note: Select to suit local market conditions. Stock dressed and matched and end matched is not recommended in widths exceeding 8 in.

(4q) Roof Boarding—

(4q1) *Grades and Species*—Same as specified hereinbefore for "Sub-flooring."

(4q2) *Dimensions*—(*Square edged*) (*Shiplapped*) (*Dressed and matched*) (*Dressed and matched and end matched*) 1 in. nominal thickness surfaced to $\frac{3}{4}$ in. or thicker and uniform width of (4 in.) (6 in.) (8 in.) (10 in.) (12 in.).

Note: Square edged material may be used, although shiplapped or dressed and matched is recommended due to its greater strength and warmth. Select to suit local market conditions. Stock dressed and matched and end matched is not recommended in widths exceeding 8 in.

(4r) Miscellaneous Framing Items—

Note: Here specify any miscellaneous framing items not customarily encountered but which are required on the particular work.

(4s) Iron and Steel—

Note: All anchors for sills, plates, etc., built into the masonry before the framing is erected should be included under the masonry specifications (see (3c), page 7). All anchors, plates, ties, stirrups, etc., attached to or a part of the framing should be included here.

(4s1) *Girder Plates*—Provide (where so detailed) (12x8x $\frac{1}{2}$ in.) (specify size) (steel) (cast iron) girder bearing plates.

(4s2) *Post Plates*—On posts 6x6 in. and under supporting spliced or butt jointed wood girders, provide full area cast iron post caps $\frac{3}{4}$ in. thick, with end clutch ribs and central rib parallel to girder to anchor ends of girders together at splice and maintain lateral contact. Provide 2 holes for spiking to girder top.

(4s3) *Stirrups*—Furnish ($\frac{1}{4}$ x1 $\frac{1}{2}$ in. steel stirrups to support all headers where specified and of finished width and depth equal to the joists. Top shall be provided with a turn-over hook to fit the top of trimmer width, punched for horizontal spiking to the trimmer side, and at bottom for spiking to bottom of header) (specify any other type).

(4s4) Miscellaneous Items—

Note: Here specify any miscellaneous items not customarily encountered but which are required on the particular work.

(4t) *Nails*—Nails shall be (*Smooth*) (*Cement Coated*) (*common wire nails*) (*sinker nails*) (*non-splitting nails*) (specify).

Note: Cement coated nails are recommended due to their greater holding power and the fact that in the same sizes as standard wire nails they are less in diameter and therefore less likely to split the wood. Since in the same size they weigh less than standard wire nails the comparative cost per pound is approximately the same. Non-splitting nails have also obvious advantages.

(4u) *Waterproof Building Paper*—Waterproof building paper shall be (specify brand) as made by (specify manufacturer).

Note: The building paper in frame construction not only protects the wood framing from moisture, but it prevents wind driven air infiltration and materially aids in fuel reduction. A high grade tough stock, permanently saturated with non-volatile waterproofing and preservative compounds is strongly advocated as an economy.

(5) Wood Posts or Columns

Note: See (4d), page 7. See details, page 6. For footings, see (3c1), page 7.

(5a) Erect wood posts over dowel anchors with full level bearing on concrete footings. Posts shall be maintained plumb and true until supported girders and joists are secured in place.

(5b) Before erection, treat bottom of posts with hot creosote to protect against moisture (and termites).

Note: This clause may be omitted if integrally waterproofed concrete is used in footings as suggested in (3b).

(5c) On all posts 6x6 in. or smaller install (cast iron) (specify) caps securely attached to tops of posts.

Note: See (4s2).

(6) Girders

Note: See (4e), page 7. See details, page 6.

(6a) *Construction of Built-up Girders*—Tops and bottoms of built-up girders shall be sized where necessary to assure even bearing on supports and under joists.

A two-piece girder shall be nailed from both sides with 10 penny nails staggered and spaced 24 in. apart along both top and bottom edges. Near center of span space nails 12 in. apart.

A three-piece girder shall be nailed in same manner as above but using 20 penny nails.

A four or five-piece girder shall be assembled by nailing three members together in the same manner as above but using fewer nails and then nail the other members to this assembly.

(6b) All splices in girders shall be square cut and close fitted, centering over columns or piers.

(6c) Ends of girders bearing on masonry walls shall be cut with a 3 in. bevel.

Note: Ends of all girders should have a bearing surface on solid concrete walls of not less than 4 in., on common brick (cement mortar) wall not less than 6 in. and when concrete block wall is used the girder should bear on wall 8 in. and be supported by a steel or cast-iron plate.

(6d) Provide (where so detailed) (2x4 in.) (specify) joist ledger strips thoroughly secured to the girder with 16 penny nails staggered and spaced 12 in. apart along both top and bottom edges.

(6e) All girders shall be set with crown edge up, carefully leveled with full bearings at ends and intermediate supports.

(6f) Ends of girders setting on masonry shall have at least 1 in. clearance on sides and ends for free circulation of air.

(6g) Where so indicated girder ends shall be provided with (steel) (cast iron) bearing plates accurately leveled and set in a $\frac{1}{2}$ in. bed of (waterproofed) Portland cement mortar. Allow mortar to set before erecting girder.

(6h) Accurately notch girders over stay-fins of posts provided with (cast iron) (specify) caps.

Note: See (4s2), page 8.

(7) Sills

Note: See (4f), page 7. See details, page 6.

(7a) All ends shall be square cut and closely fitted. Bore all sills accurately to take steel foundation anchors.

Note: See (3c2), page 7.

(7b) Double sill members shall be securely nailed together with 16 penny nails staggered and set 24 in. apart along both edges. Joints between halves and at corners shall be lapped and broken.

(7c) All sills shall be laid on a $\frac{1}{2}$ in. bed of fresh (waterproofed) Portland cement mortar, tapped lightly so as to assure a uniform, level bearing surface for the joists. Allow mortar to set before anchor bolts are tightened.

(7d) Treat the sills with a paint or dip coat of hot asphalt before erection.

Note: This clause may be omitted if tops of masonry walls are dampproofed or sills are laid over a bed of waterproofed mortar.

(8) Joists

Note: See (4g), page 7. See details, pages 6 and 10.

(8a) General—

(8a1) All joists shall be set with crown edge up, carefully leveled with full bearings at ends and intermediate supports. All headers and starting joists shall be selected for straightness.

(8a2) All butted joints shall be square cut and closely fitted.

(8a3) Space joists uniformly 16 in. o. c. (12 in. o. c. where so shown). Where required for added strength of particular floor areas, as hereinafter indicated, doubled or extra joists shall set between the regular joists so as not to interrupt the uniform spacing required for standard lath units.

(8a4) Joists (including headers and trimmers) shall not be cut away to permit pipe installations, etc., unless adequate provision is made to compensate for the loss of strength.

(8b) Framing Around Floor Openings—

(8b1) Provide accurately fitted double header and trimmer joists of the same size as the regular joists around all floor openings. If the header is longer than six (6) feet and set back more than three (3) feet from the ends of trimmer, the trimmer shall be tripled, unless it is supported by a bearing partition column or girder.

Note: See Fig. 22, page 10.

(8b2) The ends of all headers longer than 3 ft. 6 in. (except when supported by columns or bearing partitions) shall be carried in steel stirrups, supported by and secured to the trimmer. Counter sink stirrups above and below the tops and bottoms of headers and trimmers.

Note: See (4s3), page 8 and Fig. 22, page 10.

(8b3) Wherever a trimmer is cut away at the header line, (as at an open stairway) the trimmer end shall be supported at the corner by a partition or post extending down to a girder or to a concrete footing. Where impossible to use a post, the construction shall be cantilevered and strongly braced.

Note: See Fig. 30, page 14.

(8b4) Trimmers and headers around chimneys and hearths shall be set at least two (2) inches from the face of the masonry. In no case shall a framing member be allowed to set in or on a chimney wall.

(8b5) Provide correctly turned wood centers with outer ends supported on header ledger strips and butts supported on brick chimney-breast corbels for the support of rough brick hearth-arches.

Note: Omit (8b5) if reinforced concrete cantilever hearth slabs are provided.

(8b6) In fabricating headers and trimmers, a single header joist shall first be nailed to the ends of all joists supported with 20 penny nails two (2) for 2x6 in., three (3) for 2x8 in., four (4) for 2x10 in. and 2x12 in. joists). The second member shall then be nailed to the first with 16 penny nails staggered and spaced 16 in. apart along both top and bottom edges. The trimmer joists shall be nailed in a similar manner and with the same size nails, first to the ends of header joists and then to each other.

(8c) Framing Under Partitions—

(8c1) Double the joists under non-bearing partitions running parallel with the joists for spans 10 ft. or less. When span exceeds 10 ft. or partition height exceeds 9 ft. 6 in., the supporting joists shall be tripled. Doubled joists shall be separated a distance equal to the width of the supported partition sole and bridged every 18 in. with solid blocks the full joist depth (cut from joists) set with the grain running horizontally.

Note: See Fig. 26, page 12.

Where joists are tripled, first fabricate doubled joists as above and then secure a third joist at one side with 16 penny nails staggered and spaced 16 in. apart along both top and bottom edges.

Note: This provides solid nailing for the finished flooring and allows pipe space through to partition without cutting away the supports.

(8c2) When one or more non-bearing partitions are set at right angles to the joists near the center of spans exceeding 10 ft., alternate joists shall be doubled.

(8c3) When bearing partitions are not directly supported on girders or bearing partitions, but are offset not to exceed $\frac{1}{20}$ of the span of the supporting joists running at right angles to the partition, then alternate joists shall be doubled. If distance away from girder or bearing partition exceeds $\frac{1}{20}$ of the span, all joists shall be doubled.

(8d) Framing for Tile and Similar Floors—

Note: The joists under toilet, bathroom and similar floors should provide for an additional dead load of 30 lbs. per sq. ft. for tile floors. Provide for an additional 20 lbs. per sq. ft. for plumbing fixtures. This often requires that joist be set 12 in. o. c. or extra joists set between regular joists. See Fig. 23, page 10.

(8d1) Where tile or similar floors are to be installed, the top edges of joists directly under these floors shall be tapered and 1x2 in. ledger plates nailed along each side to support the cut-in sub-floor.

(8d2) Joists shall be arranged, wherever possible, to permit installation of pipes with a minimum amount of cutting away of the joists. If this is not possible, headers and trimmers shall be provided to compensate for the loss of strength.

Note: See Fig. 23, page 10.

STANDARD DETAILS FOR HOUSE FRAMING

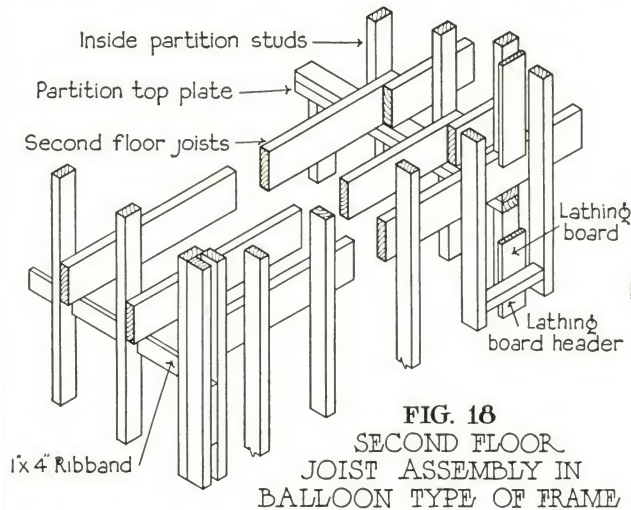


FIG. 18

SECOND FLOOR
JOIST ASSEMBLY IN
BALLOON TYPE OF FRAME

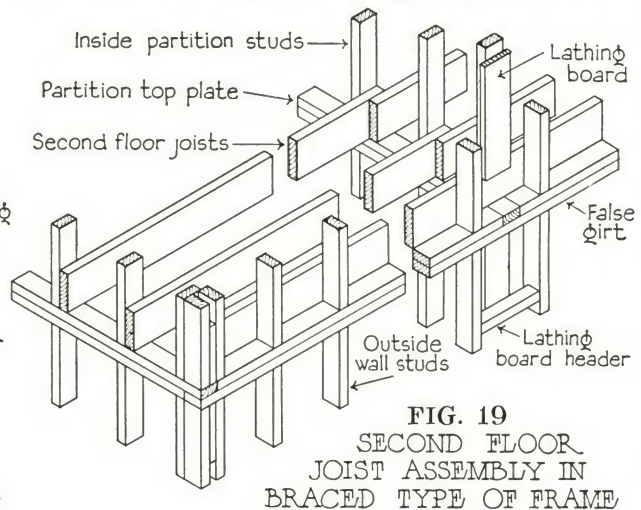


FIG. 19

SECOND FLOOR
JOIST ASSEMBLY IN
BRACED TYPE OF FRAME

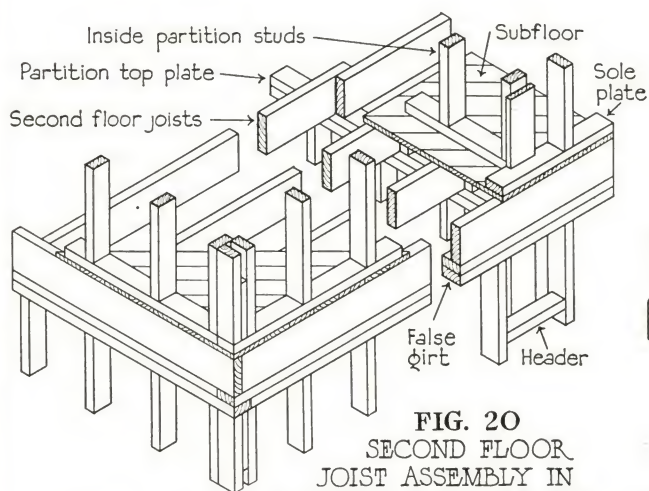


FIG. 20

SECOND FLOOR
JOIST ASSEMBLY IN
PLATFORM TYPE OF FRAME

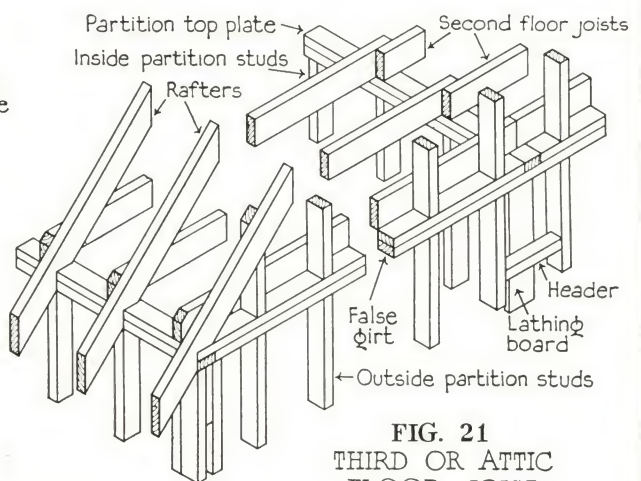


FIG. 21

THIRD OR ATTIC
FLOOR JOIST
ASSEMBLY

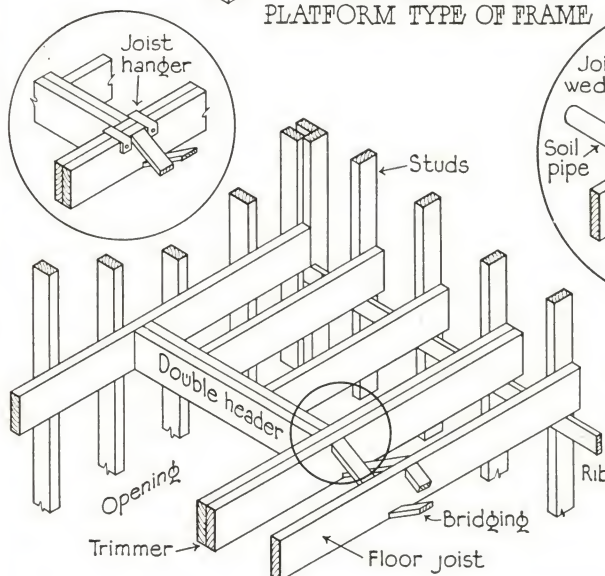


FIG. 22 FRAMING AROUND FLOOR OPENING

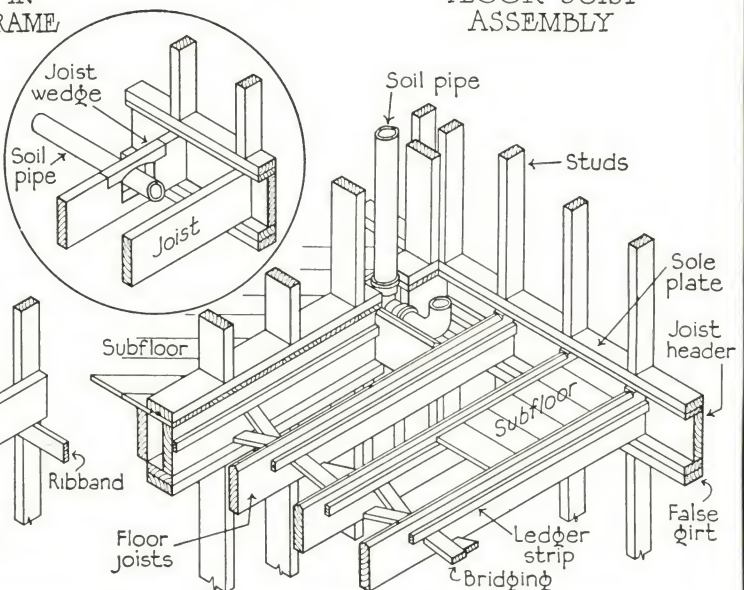


FIG. 23 FRAMING JOIST UNDER BATHROOM

(8e) Framing Joists to Girders—

Note: Choose and include the clauses which apply to the particular construction detailed.

(8e1) Joists Bearing on Top of Girder—

Note: This method, illustrated by Fig. 14, page 6, is the most common, simplest and best when it is not necessary to conserve head room. It does not take away from the strength of joists. Can be used in connection with either the PLAIN SILL or BOX SILL (see Figs. 11, 12 and 13, page 6). The shrinkage factor can be reduced by framing bearing partition studs to rest directly on girder. (See Fig. 25, page 12).

Joists shall lap each other at least six (6) inches uniformly over the girder and shall be nailed together securely where they lap, with two 10 penny nails driven from each side.

(8e2) Joists, Stirrup Hung, to Flush-top Girders—

Note: This method, illustrated by Fig. 15, page 6, is recommended where it is necessary to conserve head room. Adapted for use in connection with PLAIN or BOX SILL (see Figs. 12 and 13, page 6).

Ends of joists shall be square cut and tightly fitted against girder. Joists shall be sized to form even bearing surface over countersunk iron stirrup straps. Secure joists to stirrups with a 10 penny nail driven through bottom of stirrup.

(8e3) Joists Notched over top of Girders and Supported on Ledger—

Note: This method, illustrated by Fig. 17, page 6, is suitable for more economical construction on small house work. Does not provide sufficient bearing surface for long joist spans. Reduces shrinkage factor to some extent.

Notches in joists shall be cut evenly so as to secure level surface for sub-floor and with at least six (6) inch lap. Cut notches so that all load shall bear on ledger strip with $\frac{1}{8}$ in. clearance over girder top. Joists shall be nailed together securely where they lap each other, using two 10 penny nails driven from each side.

(8e4) Joists Notched and Carried on a Ledger and Fitted Flush with Top of Girder—

Note: This method, illustrated in Fig. 16, page 6, is not recommended. It is often met with in construction and may be used when properly reinforced at the weak point. While it provides increased head room and reduces shrinkage, the joists are apt to crack at the angle of the notch unless definite precautions are taken.

Notches in joists shall be accurately cut to give full bearing on the ledger strip with the top joists set $\frac{1}{4}$ in. above the top of the girders. Sides and bottoms of joists shall be toe-nailed to girder and ledger. Securely nail a 1x4 in. cleat on each side of each joist close to the ledger.

(8f) Framing First Floor Joists at Outside Walls—

Note: Provide for beam-filling in Masonry Specifications.

(8f1) Plain Sill Construction—

Note: This method of support, illustrated by Fig. 11, page 6, is adapted to the BRACED or BALLOON FRAME.

All joists shall be toe-nailed to sill plate with three 10 penny nails and separated by spacers of the same size as the joist. Spacers shall be set back from ends of joist a distance equal to the width of studs and shall be fastened in place by two 16 penny nails driven into each end through the joists. Ends of joists shall be nailed to studs with three staggered 16 penny nails.

The starting joist shall set back from outside edges of sill plate a distance equal to the width of studs and shall be toe-nailed to the sill plate with 10 penny nails spaced 20 in. apart and to each stud with three 16 penny nails.

(8f2) Box Sill with Plate—

Note: This method of support, illustrated by Fig. 12, page 6, is adapted to the BALLOON or PLATFORM FRAME.

Both headers and starting joists shall be set flush with the outside of sill plate and shall be toe-nailed to it with 10 penny nails set 20 in. apart.

All joists shall be toe-nailed, each side, to sill plates with one 10 penny nail.

(8f3) Box Sill without Sill Plate—

Note: This method of support, illustrated by Fig. 13, page 6, is used with BALLOON or PLATFORM FRAME.

Both headers and starting joists shall be set flush with the outside of studding above.

The headers shall lap the ends of the starting joists at all corners and shall be nailed to them with three 16 penny nails for 2x8 in. joists, and four 16 penny nails for 2x10 in. and 2x12 in. joists.

All joists shall be set 16 in. o. c. (12 in. o. c. where so indicated) measured along top edge of headers. Headers shall be nailed to the joist ends with the same number and size of nails as specified above.

All joists shall set flush with top of main headers.

(a) Provide joist-size false headers along the sides and false joists across the ends set flush with inside face of foundation wall, toe-nailed in place. Along the ends, provide solid spacers the full joist depth set four feet apart o. c.

This assembly shall be leveled-up and "beam-filling" (installed by others) shall be tamped under all members that do not have full bearing on foundation walls. "Beam-filling" shall be added sufficient to fill all boxes flush with top of joists. Allow fill to set, before putting on the sub-floor.

Note: Omit this clause (a) if brick beam-filling is used as in (b). Provide for furnishing and installing of beam-filling in Masonry Specifications for 1-3-6 concrete mixture with a limited amount of water to prevent as far as possible the swelling of joists and subsequent shrinkage. Brick beam-filling is often preferred since less moisture is contained in the mortar necessary to lay the dry brick. See Fig. 13, page 6.

(b) This assembly shall be leveled-up and the bed of mortar for brick beam-filling (installed by others) shall be thoroughly tamped under all members that do not have full bearing on foundation walls. Brick beam-filling shall be added using as little mortar as possible to fill from the top of wall flush with tops of joists and inner face of wall. Allow fill to set before putting on sub-floor.

Note: Omit this clause (b) if concrete beam-filling is used as in (a) above. See note above. See Fig. 12, page 6.

(8g) Framing Second Floor Joists—**(8g1) Balloon Frame Construction—**

Note: This method is illustrated by Fig. 18, Page 10.

The ribbands shall be let into studs their full thickness. Ribbands shall be selected for straightness and leveled-up so as to support all joists evenly, and shall be nailed to each stud with two 8 penny nails.

The joists shall be placed against sides of studs and nailed to them with three 16 penny nails. The starting joists shall be nailed to each end wall stud with two 16 penny nails.

The inside ends of all joists shall be supported on partitions having a double 2x4 in. plate with the studs in this partition set as nearly under each joist as is possible. Joists shall lap each other directly over bearing partitions for a distance equal to the width of the partition plate and shall be nailed together with two 10 penny nails driven from each side. All joists shall be toe-nailed, each side of laps, to the bearing partition plates with one 10 penny nail.

(8g2) Braced Frame Construction—

Note: This method is illustrated by Fig. 19, page 10.

The joists shall be placed 16 in. o. c. (12 in. o. c. where studding is 12 in. o. c.) measured along the false girt and shall be toe-nailed to it with two 10 penny nails on each side.

The joists shall be placed against sides of studs and nailed to them with three 16 penny nails. The starting joists shall be nailed to each end wall stud with two 16 penny nails.

STANDARD DETAILS FOR HOUSE FRAMING

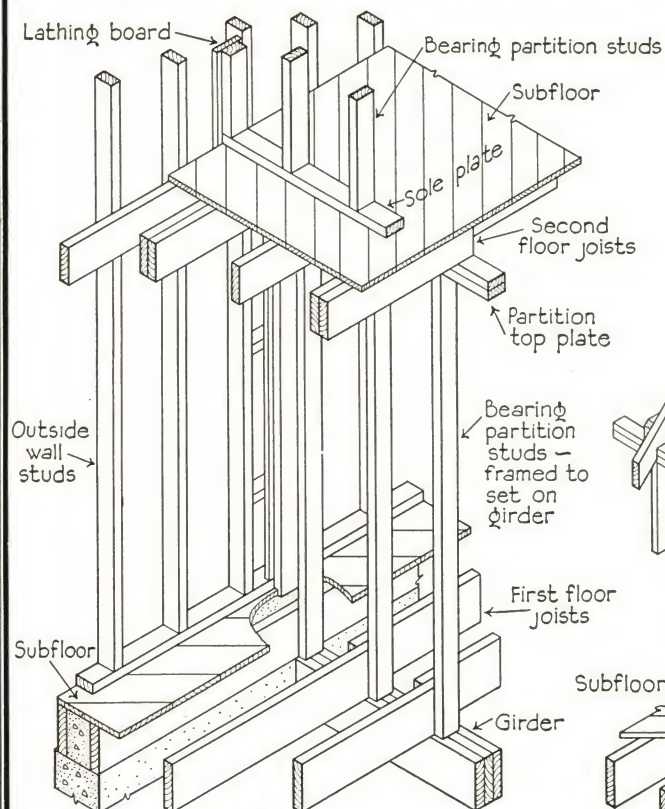


FIG. 25
FRAMING FOR BEARING PARTITION

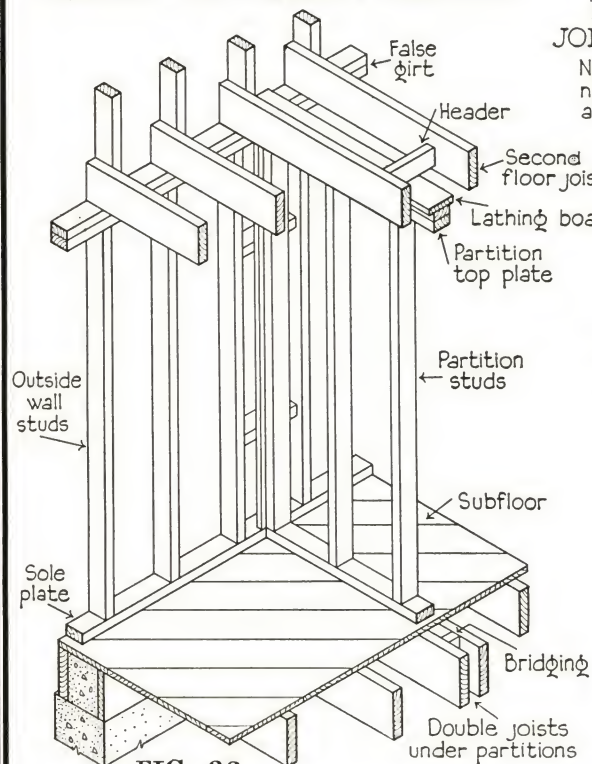


FIG. 26
FRAMING FOR NON-BEARING PARTITION

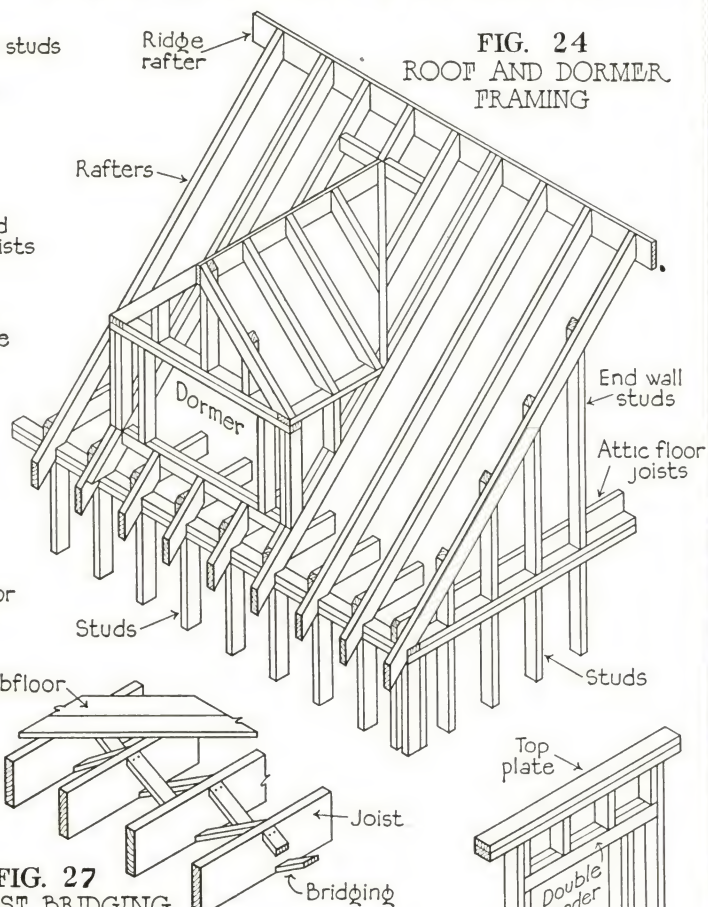


FIG. 27
JOIST BRIDGING
Note: Bridging should be nailed at top only until after subflooring is laid.

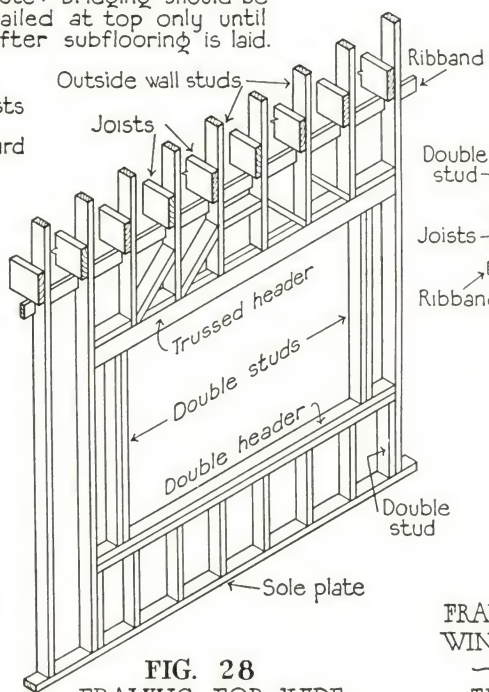


FIG. 28
FRAMING FOR WIDE WINDOW OPENINGS

FIG. 24
ROOF AND DORMER FRAMING

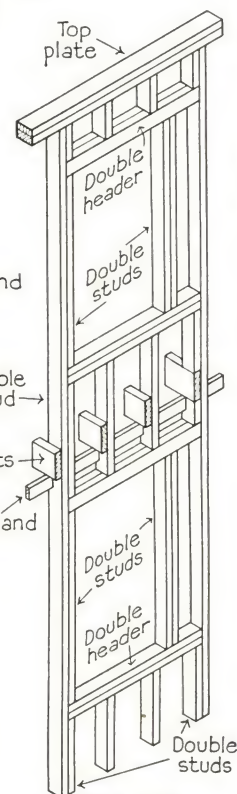


FIG. 29
FRAMING FOR TWO WINDOW OPENINGS - ONE ABOVE THE OTHER IN BEARING WALL

The inside ends of all joists shall be supported on partitions having a double 2x4 in. plate with the studs in this partition set as nearly under each joist as is possible. Joists shall lap each other directly over bearing partitions for a distance equal to the width of the partition plate and shall be nailed together with two 10 penny nails driven from each side. All joists shall be toe-nailed, each side of laps, to the bearing partition plates with one 10 penny nail.

(8g3) Platform Frame Construction—

Note: This method is illustrated by Fig. 20, page 10.

Both headers and starting joists shall be set flush with the outside edge of false girt and shall be toe-nailed to it with 10 penny nails set 20 in. apart.

All joists shall be toe-nailed, each side, to false girt with one 10 penny nail.

Headers shall be nailed to the joist ends with three 16 penny nails for 2x8 in. joists, and four 16 penny nails for 2x10 in. and 2x12 in. joists.

The inside ends of all joists shall be supported on partitions having a double 2x4 in. plate with the studs in this partition set as nearly under each joist as is possible. Joists shall lap each other directly over bearing partitions for a distance equal to the width of the partition plate and shall be nailed together with two 10 penny nails driven from each side. All joists shall be toe-nailed, each side of laps, to the bearing partition plates with one 10 penny nail.

(8h) Framing Third or Attic Floor Joists—

Note: The method illustrated by Fig. 21, page 10, for supporting outer ends of the third or attic floor joist is adapted to either the BRACED, BALLOON or PLATFORM types of frame.

(8h1) Joists shall be spaced 16 in. o. c. (12 in. o. c. where so indicated) measured along the plate and toe-nailed to it with two 10 penny nails on each side.

Ends of all joists shall set flush with outside edge of plate and top corners shall be chamfered (when necessary) after rafters have been nailed in place.

(8h2) The joists shall be placed against sides of rafters and nailed to them with three 16 penny nails. The starting joists shall be nailed to each end wall stud with two 16 penny nails.

The inside ends of all joists shall be supported on partitions having a double 2x4 in. plate with the studs in this partition set as nearly under each joist as is possible. Joists shall lap each other directly over bearing partitions for a distance equal to the width of the partition plate and shall be nailed together with two 10 penny nails driven from each side. All joists shall be toe-nailed, each side of laps, to the bearing partition plates with one 10 penny nail.

(8i) Bridging—

Note: See (4i), page 7. See Fig. 27, page 12.

(8i1) Cross bridge all floor joists with one (1) row of bridging for spans from six (6) ft. to ten (10) ft.; two (2) rows for all spans from ten (10) ft. to twenty (20) ft.

Bridging shall divide the spans into equal parts and shall be nailed at both ends with two 8 penny nails driven at right angles to face of joists. All nails shall be started before members are set in place. Bridging shall be put in and the top ends nailed before laying the sub-floor. The bottom ends shall be nailed after the sub-floors have been laid.

Bridging shall be put in between the first three or four joists opposite the ends of headers when these headers are set two (2) ft. or more away from the end of the trimmer or from the regular row of bridging.

Note: See Fig. 22, page 10.

(8i2) Add a 1x4 in. continuous strip nailed to the underside of the joists (when not plastered) beneath each line of diagonal bridging.

Note: On first story floors carrying heavy or concentrated loads this provision adds considerably to the strength in

assisting in distributing the load over several joists.

(8j) Miscellaneous.

Note: Here include any special structural features not ordinarily encountered, but necessary in the particular work.

(9) Studding (Outside Walls)

Note: See (4k), page 7.

(9a) General—

(9a1) Studs shall be spaced 16 in. o. c. (12 in. o. c. where so designated).

(9a2) All corners shall be made of three (3) studs so set as to provide approximately a full stud thickness on each side of the internal angle and all thoroughly blocked and secured together with 16 penny nails spaced 12 in. apart o. c.

Note: See Figs. 18, 19 and 20, page 10 and Fig. 31, page 14.

(9a3) Over the rough flooring, with outer edge flush with joist construction, lay a single 2x4 in. (2x6 in. for 2x6 in. studs) sole, secured through flooring to each joist with two 16 penny nails.

Note: Include (9a3) for BALLOON with box sill and PLATFORM Frame Construction. See Figs. 1 and 3, page 4.

(9a4) All studs shall be one piece (not spliced) from sill to plate (or girt) except at openings, in which case they shall be framed as specified for these openings.

All studs around openings and at corners shall be selected for straightness.

All studs shall have full bearing on sills or other bearing surfaces and shall be toe-nailed with four 8 penny nails (two on each side), except where these studs set against joists in which case secure with two nails on the one side.

Where studs set against joists, they shall be nailed to the joist with 16 penny nails, two for 2x6 in. and three for 2x8 in. joists and four for 2x10 in. or 2x12 in. joists.

All main studs shall be square cut and of uniform length so as to furnish uniform bearing for wall plates.

Studding at chimney shall be set at least (one (1) inch) (specify) from the face of the masonry.

Plates shall consist of two pieces of the same size material as the studs. They shall be lapped at the corners and at all joints. All joints shall be made directly over the studs.

Plates shall be nailed to top ends of each stud, one thickness at a time, with two 16 penny nails and to each other with 10 penny nails staggered and spaced 16 in. along each edge.

(9a5) All (gable) (and) (dormer) studs shall be notched and beveled to receive end rafters and rafters nailed to each stud with two 10 penny nails.

Note: See Fig. 24, page 12.

(9b) Framing Around Openings—

Note: See Figs. 28 and 29, page 12, and Figs. 31 and 33, page 14.

Double studs and headers shall be used around all openings (where 2x6 in. studs are used, the headers shall be tripled). All header members shall be securely nailed together, those at opening heads set on edge and secured flush with the outside face of studding.

For openings three (3) ft. wide or less in bearing walls and four (4) ft. wide or less in non-bearing walls, the material used for headers shall be the same size as studs. For wider openings up to five (5) ft. in bearing walls and seven (7) ft. in non-bearing walls, the material used for headers shall be of same thickness, but at least 2 in. wider than the studs. For wider openings the headers shall be symmetrically trussed.

STANDARD DETAILS FOR HOUSE FRAMING

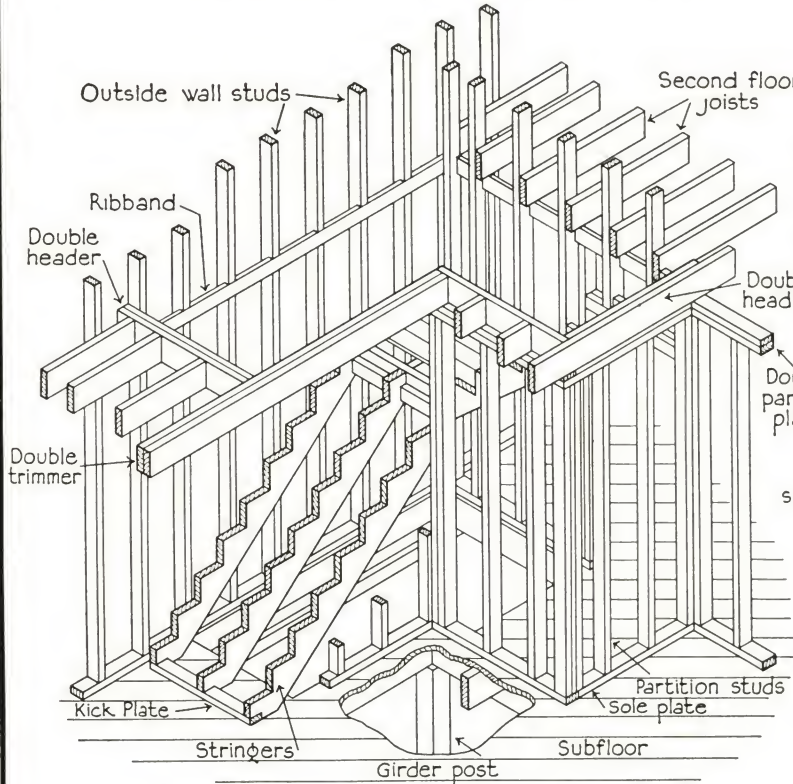


FIG. 30 FRAMING FOR OPEN STAIRWAY

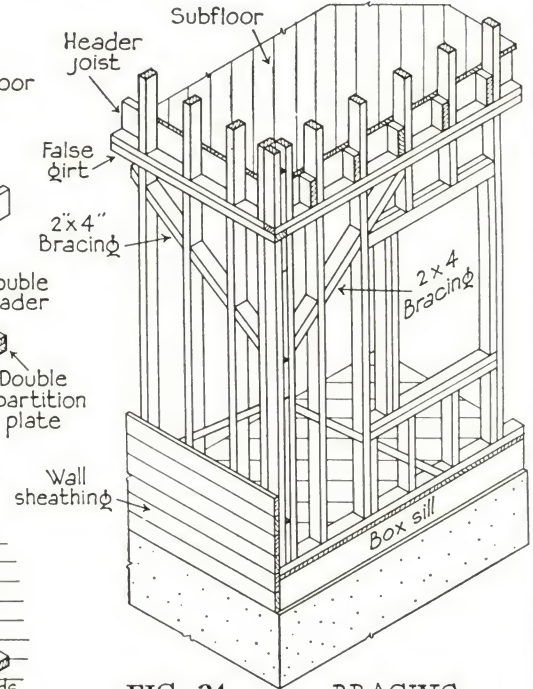


FIG. 31 BRACING
2x4" Cut between studs
Sheathing applied horizontally

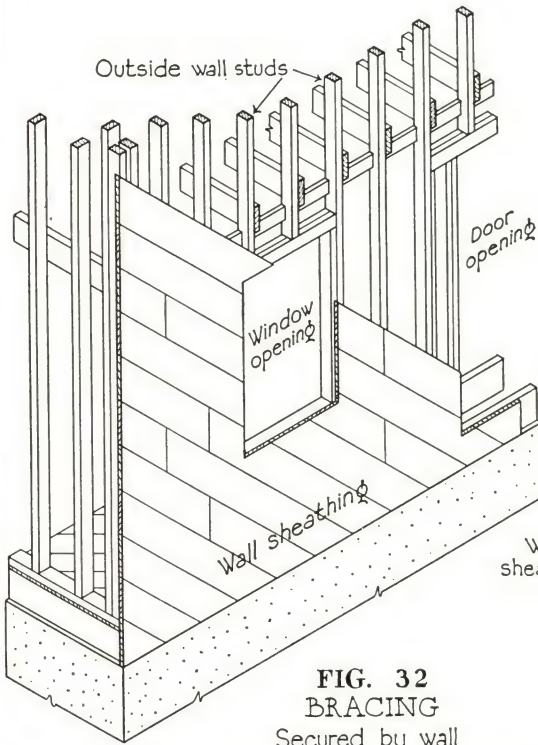


FIG. 32 BRACING
Secured by wall sheathing applied diagonally

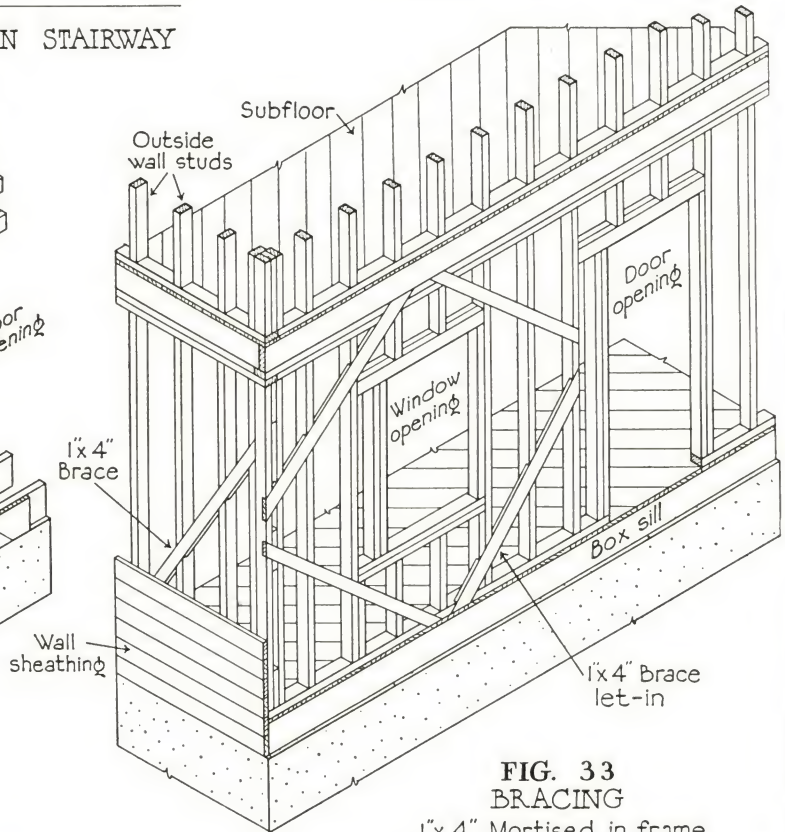


FIG. 33 BRACING
1x4" Mortised in frame
Sheathing applied horizontally

In bearing walls the ends of the bottom headers in all window openings shall be supported by short studs nailed to the regular studs and extending down to the sill or second floor joists. Where a window opening in second floor comes above a first floor opening, studs at both sides of the openings shall be reinforced all the way up to the roof plate by short studs cut-in between all headers and nailed to them.

Double studs and bottom header members shall be nailed together with 16 penny nails staggered and spaced 16 in. apart along both edges. 2x4 in. headers shall be fastened to studs with two 16 penny nails driven through the studs into each end. The ends of all short studs fitted between the headers shall be toe-nailed to the headers with four 8 penny nails.

At windows, allow the dimensions detailed between finished jambs, sills and heads to rough framing for weight boxes, case-ment jambs, head jambs, etc.

Over the figured door sizes, allow (3 in.) (specify) in width and (2½ in.) (specify) in height for rough framing.

(9c) Bracing—

Note: Bracing is essential in all frame construction, because it provides rigidity, resistance to wind pressure and assists to prevent plaster cracks. The three methods following are given in the order of effectiveness. Specify one.

(9c1) Apply the sheathing diagonally.

Note: See Fig. 32, page 14. Also par. (16a), page 16.

(9c2) Provide let-in diagonal bracing at each story at all corners, set approximately at 45°, with upper ends on opposite side of corner studs and approximately full story height. Bracing shall be 1x4 in. accurately let-in the full thickness, flush with the outside face of studs and nailed to each stud with two 8 penny nails. Thoroughly brace at corners with two braces running in opposite direction where openings close to corners interfere with standard bracing.

Note: Use where horizontal sheathing is specified. See Fig. 33, page 14.

(9c3) Provide cut-in diagonal bracing at each story at all corners set at 45° with the upper ends on adjacent sides of corner studs and carried the full story height when possible. Braces shall be the same dimensions as the studding, accurately cut, tightly fitted between studding and in line. Nail bracing at each stud with two 10 penny nails. Where openings interfere with continuous bracing apply in shorter lengths at floor and ceiling of each story.

Note: Use where horizontal sheathing is specified. See Fig. 31, page 14.

(10) Studding (Partitions)

Note: See (4k), page 7.

(10a) **General**—All material shall fit squarely and tightly against all bearing surfaces and shall be nailed as specified for outside wall studs.

Wherever possible, bearing partitions shall set directly over girders or other bearing partitions and the studs in these partitions shall be framed to rest directly on the girders or bearing wall plates (except that when the platform type of frame is used, then the second story partition studs shall set on a single sole of the same size material as the stud nailed to the sub-floor).

Note: See Fig. 25, page 12, and Fig. 19, page 10. Omit bracketed clause in italics if PLATFORM type of construction is not used.

All non-bearing partition studs shall be set on a single plate nailed to the sub-floor except where a double plate permits use of standard length materials.

All bearing partitions shall be capped with a double plate and all non-bearing partitions with a single plate except where a double plate permits the use of standard length materials.

All studs, except those around closets or in other very short partitions, shall be set with edges parallel with the partition line.

Studding at chimneys shall be set at least (one (1) inch) (specify) from the face of the masonry.

(10b) **Studding at Stair Wells**—Carry all studding for stair wells continuously from First Story to Top Story ceiling. Let in a ribband to support joists at floors and construct as specified for Balloon Outside Wall Construction.

Note: This prevents the bulging and cracking of plaster, usually encountered in open stair wells at the second and

third floor levels due to shrinkage of floor joists, plates, etc.

(10c) **Framing Around Openings**—Framing around all openings shall be as specified for studding in outside walls.

Allow (3 in.) (specify) in width and (2½ in.) (specify) in height over the figured door size for rough framing.

(10d) **Sliding Door Partitions**—Notch the studs on the inside 1 in. and set in a spreader of size detailed and located to take the door tracks and hangers specified. Furnish 2 in. thick plank to terminate the vertical end of pocket, allowing at least 2 in. clearance at back of door. Line pockets, both sides with (⅝ in. ceiling) (specify). Erect in accordance with the manufacturer's details and printed directions, the specified tracks, hangers, etc.

(10e) Miscellaneous—

Note: Here include any special items, such as special partition construction for accordion partitions, etc.

(11) Fire Stopping

Note: The function of fire stopping is to increase fire safety by stopping the circulation of air and fire within the walls, partitions and floors. See Fig. 5, page 4.

Fire stopping shall be provided at each floor level, both in the outside walls and bearing partitions by placing tightly fitted headers between the ends of the joists at these points. The boxes formed by these headers shall be filled with incombustible materials (crushed mortar) (gypsum) (mineral wool) (specify), so as to shut off more effectively the circulation of air.

(12) Construction to Balance Shrinkage

Note: Lengthwise shrinkage of timber is practically negligible, but all lumber tends to shrink and swell across the grain with changes in atmospheric conditions. It is advisable from this standpoint to limit horizontal members as much as possible but, as it cannot be avoided entirely, it is necessary to balance the thickness or depth of the horizontal lumber in exterior and interior bearing walls. See Fig. 4, page 4.

(12a) The thickness of horizontal framing members in exterior and interior walls shall be balanced on each floor level as nearly as possible.

(13) Rafters

Note: See (4h), page 7.

(13a) **Flat Roofs**—All low-pitch flat roofs, decks, etc., shall be constructed and bridged in exact accordance with the specification for floor joists.

(13b) Sloped Roofs—

(13b1) All rafters shall be notched or beveled so as to secure a bearing of not less than 3 in. on the wall plate and shall be toe-nailed securely to the plate with two 10 penny nails on each side. If set against the attic joists, they shall be nailed to the joists with two 16 penny nails in addition to the plate nailing.

Note: See Fig. 21, page 10, and Fig. 24, page 12.

(13b2) All rafters shall be cut and beveled so as to fit tightly against all (ridge) (hip) (and) (valley) rafters and shall be nailed securely to them with four 8 penny nails.

(13b3) (Except on hipped roofs) collar ties of same size material as the regular rafters shall be nailed to each pair of rafters as near half way up from the plate as is possible.

(13b4) Where due to lack of headroom, collar ties must be omitted, nail 1x4 in. or 1x6 in. ties to the underside of rafters on both slopes extending from the center of the ridge diagonally to the corners of the building.

Note: A portion only of the strengthening effect of collar ties is obtained by this method.

(13b5) Where heavy wind or snow loads are prevalent and when attic is not used for living quarters, the roof shall be strengthened with braces set at an angle to the rafters and about four feet apart extending from top of partitions preferably up to rafters near center of span. Braces shall be notched over a 2x4 in. member set on edge extending the full length of the roof section and nailed against the under side of the rafters.

(13c) **Framing Around Openings**—Rafters shall be doubled on each side of (*dormers*) (*chimneys*) (*scuttles*) (*skylights*) (*specify*) etc. and double headers shall be used around all openings where one or more of the regular rafters have been cut away.

All headers and double trimmers shall be nailed together with 16 penny nails staggered and spaced 20 in. apart along both edges.

Note: See Fig. 24, page 12.

(13d) Miscellaneous—

Note: Here include any special structural features not ordinarily encountered, but necessary in the particular work.

(14) Stair Construction

Note: See (4j), page 7.

(14a) **General**—(*Strings*) (*carriages*) shall be adequately supported at floors and landings. At all floors provide a 2x4 in. kick-plate at right angles to the stair run to take the thrust of the (*strings*) (*carriages*). Notch the (*strings*) (*carriages*) over kick-plates at floors and ledger strips or trimmers at landings and receiving floors and securely toe-nail each to these supports.

Note: See Fig. 30, page 14.

(14b) **Landings**—Landings shall be framed with double trimmers and in all respects as specified for joists. Securely support landings on walls or partitions and brace and bridge against thrust. At the upper ends of stair runs provide a 1x2 in. ledger strip to receive stair strings or carriages.

(14c) **Strings**—Cut solid strings accurately to the pitch, rise and run of risers and treads. Provide (3) (*specify*) strings to each run.

Note: Omit (14c) if carriages are used.

(14d) **Carriages**—Carriages, (3) (*specify*) to each run, shall be built up of 2 in. thick stock on edge to the required dimension. Members shall be secured together with 16 penny nails staggered and spaced 16 in. apart along both top and bottom edges. Set carriages accurately to the stair run and pitch. Fit 2 in. thick triangular blocks, cut from joist lumber to the rise and tread, on the center of each carriage accurately in line. Toe-nail each block to the carriage.

Note: Omit (14d) if strings are used.

(15) Sub-flooring

Note: See (4o), page 8.

(15a) Except as hereinafter noted, all sub-flooring shall be laid diagonally at approximately 45° with the boards of alternate stories run at right angles to those above and below.

(15b) All sub-flooring shall be fitted tightly together and nailed to each bearing with 8 penny nails, two to each board 4 or 6 in. wide, three to each board 8 in. wide and four to each board 10 or 12 in. wide.

(15c) All joints shall be broken and made directly over the center of a joist, unless end matched material is used, when the joint may occur over or between the joists, provided the joints in two adjacent boards do not occur over the same joist or between the same two joists.

(15d) Except as hereinafter noted, the sub-flooring shall be continuous across the building. Where bearing partition studs extend below the top of the floor joist, the sub-flooring shall be cut to fit around each stud with the ends supported on cleats.

(15e) At the outside walls the sub-flooring shall extend to the outside face of studs where box sill or platform frame is used, otherwise the sub-flooring shall extend to the inside face of studs.

(15f) In (*bathrooms*) (*kitchens*) (*vestibules*) (*specify*) where there is a (*tile*) (*marble*) (*specify*) or similar floor laid over wood joists cut in the rough flooring between the joists and secure to ledger plates to provide for a reinforced concrete bed.

(16) Wall Sheathing

Note: See (4p), page 8.

(16a) All sheathing shall be applied diagonally at approximately 45°, with all boards on each side of the building running in the same direction.

Note: Diagonal sheathing is strongly recommended due to its greater bracing strength. See Fig. 32, page 14. However, where exterior stucco is applied, horizontal sheathing should always be used.

(16b) All sheathing shall be applied horizontally.

Note: Wherever used, wind bracing as specified in (9c2) and (9c3) should always be included. See Figs. 31 and 33, page 14.

(16c) All sheathing shall be tightly fitted together and nailed to each bearing with 8 penny nails, two to each board 6 in. wide, three to each board 8 in. wide and four to each board 10 or 12 in. wide.

(16d) All joints shall be broken and made directly over the center of a stud, unless end matched material is used, when the joint may occur over or between the studs, provided the joints in two adjacent boards do not occur over the same stud or between the same two studs. No joint shall occur directly at the top or bottom of an opening.

(16e) The boards directly at the top and bottom of all openings shall continue to at least the second stud on each side of the opening.

Note: Include (16e) only when horizontal sheathing is used.

(16f) The sheathing shall be cut off at the center line of the first stud at the sides of all window and door openings, 1 in. above the bottom edge of all top headers, and flush with the top edge of the bottom headers.

Note: Include (16f) where, as is customary, wide blind stops are detailed for window frames. Where standard brick veneer frames are used, omit this clause.

(16g) All sheathing shall be continuous except for openings and shall extend full width to the outside edge of corner studs and to or below the bottom edge of the sill as detailed. Boards shall be notched to fit closely around all rafters at the eaves and shall extend up and be trimmed off flush with the top edge of all rafters.

(17) Roof Boarding

Note: See (4q), page 8.

(17a) All roof boarding shall be laid at right angles to the rafters.

(17b) All boards shall be fitted tightly together and nailed to each bearing with 8 penny nails, two (2) to each board 4 or 6 in. wide, three (3) to each board 8 in. wide and four (4) to each board 10 or 12 in. wide.

(17c) All joints shall be broken and made directly over the center of a rafter, unless end matched material is used, when the joint may occur between the rafters provided that the joints in two adjacent boards do not occur between the same two rafters.

(17d) All boards supporting the end rafters or barge boards shall be long enough to extend over at least two of the regular rafters.

(17e) Form all crickets, saddles, etc. (*back of chimneys*) (*specify*) etc. as may be required to drain the roof areas properly to (*gutters*) (*leader drains*) (*specify*). They shall be formed of accurately fitted roof boarding secured to strongly braced framing built on top of the regular roof boarding.

(18) Building Paper

(18a) Cover all sheathing and roof boarding with building paper, laid at right angles to the studding and rafters, lapped at least 2 in. at joints to shed water and adequately secured with nails driven through standard galvanized sheet-metal washers or lath cleats.

(18b) When window and door frames are installed provide and install 8 in. wide strips of building paper, secured over the frames back of outside casings and lapping over the regular building paper.

ENGINEERING DATA—For Determining the Correct Sizes of Wood Columns, Girders, Joists and Rafters

STANDARD SIZES OF LUMBER

Recommended by U. S. Department of Commerce

Type of Lumber	Nominal Size		Actual Size S4S At Comm. Dry Shp. Wt.	
	Thickness	Width	Thickness	Width
Dimension 4-SQUARE Guide-Line FRAMING	2 in.	4 in.	1 ⁵ / ₈ in.	3 ⁵ / ₈ in.
	2 in.	6 in.	1 ⁵ / ₈ in.	5 ⁵ / ₈ in.
	2 in.	8 in.	1 ⁵ / ₈ in.	7 ¹ / ₂ in.
	2 in.	10 in.	1 ⁵ / ₈ in.	9 ¹ / ₂ in.
	2 in.	12 in.	1 ⁵ / ₈ in.	11 ¹ / ₂ in.
Timbers	4 in.	6 in.	3 ⁵ / ₈ in.	5 ¹ / ₂ in.
	4 in.	8 in.	3 ⁵ / ₈ in.	7 ¹ / ₂ in.
	4 in.	10 in.	3 ⁵ / ₈ in.	9 ¹ / ₂ in.
	6 in.	6 in.	5 ¹ / ₂ in.	5 ¹ / ₂ in.
	6 in.	8 in.	5 ¹ / ₂ in.	7 ¹ / ₂ in.
	6 in.	10 in.	5 ¹ / ₂ in.	9 ¹ / ₂ in.
	8 in.	8 in.	7 ¹ / ₂ in.	7 ¹ / ₂ in.
Common Boards	1 in.	4 in.	2 ⁵ / ₈ in.	3 ⁵ / ₈ in.
	1 in.	6 in.	2 ⁵ / ₈ in.	5 ⁵ / ₈ in.
	1 in.	8 in.	2 ⁵ / ₈ in.	7 ¹ / ₂ in.
	1 in.	10 in.	2 ⁵ / ₈ in.	9 ¹ / ₂ in.
	1 in.	12 in.	2 ⁵ / ₈ in.	11 ¹ / ₂ in.
Shiplap Boards	1 in.	4 in.	2 ⁵ / ₈ in.	3 ¹ / ₈ in. face
	1 in.	6 in.	2 ⁵ / ₈ in.	5 ¹ / ₈ in. face
	1 in.	8 in.	2 ⁵ / ₈ in.	7 ¹ / ₈ in. face
	1 in.	10 in.	2 ⁵ / ₈ in.	9 ¹ / ₈ in. face
	1 in.	12 in.	2 ⁵ / ₈ in.	11 ¹ / ₈ in. face
Tongued and Grooved Boards	1 in.	4 in.	2 ⁵ / ₈ in.	3 ¹ / ₄ in. face
	1 in.	6 in.	2 ⁵ / ₈ in.	5 ¹ / ₄ in. face
	1 in.	8 in.	2 ⁵ / ₈ in.	7 ¹ / ₄ in. face
	1 in.	10 in.	2 ⁵ / ₈ in.	9 ¹ / ₄ in. face
	1 in.	12 in.	2 ⁵ / ₈ in.	11 ¹ / ₄ in. face

WOOD POSTS OR COLUMNS

SIZES OF WOOD COLUMNS FOR VARIOUS LOADS AND COLUMN HEIGHTS Based on Use of No. 1 Common Douglas Fir

Load on Column (lbs.)	Length of Column					
	5'-0"	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"
	Nominal Size of Column Required					
10,000	4x6 in.	4x6 in.	4x6 in.	4x6 in.	4x6 in.	4x6 in.
15,000	4x6	4x6	4x6	4x6	6x6	6x6
20,000	6x6	6x6	6x6	6x6	6x6	6x6
25,000	6x6	6x6	6x6	6x6	6x6	6x6
30,000	6x6	6x8	6x8	6x8	6x8	6x8
35,000	6x8	6x8	6x8	6x8	6x8	6x8
40,000	6x8	6x8	8x8	8x8	8x8	8x8
45,000	8x8	8x8	8x8	8x8	8x8	8x8
50,000	8x8	8x8	8x8	8x8	8x8	8x8
55,000	8x8	8x8	8x8	8x8	8x8	8x8

Reference—Page 50, Bulletin No. 145, National Committee on Wood Utilization, U. S. Department of Commerce, "Light Frame House Construction."

Instructions for Determining Column Sizes

First—Use the total load per linear foot of girder obtained when determining girder sizes.

Second—Determine length of girder span being supported by column (see diagram, page 19) (this is equal to one-half

total distance from column measured both ways to next column or bearing wall, except when the girder is continuous over this column and broken over the column or bearing wall on each side in which case it is equal to $\frac{1}{2}$ this total distance).

Third—Multiply the length of this span in feet by load per linear foot.

Fourth—Refer to table. Read down in column at left to load already determined—then across to column corresponding to length of column (distance from concrete footing to under side of girder). The figure at this intersection represents the size of column required.

WOOD GIRDERS

SIZES OF BUILT-UP WOOD GIRDERS FOR VARIOUS LOADS AND SPANS Based on Douglas Fir 4-SQUARE Guide-Line FRAMING

Deflection not over $\frac{1}{360}$ of Span—Allowable Fiber Stress 1600 lbs. per sq. in.

Load per Linear Foot of Girder	Length of Span				
	6'-0"	7'-0"	8'-0"	9'-0"	10'-0"
	Nominal Size of Girder Required				
750	6x8 in.	6x8 in.	6x8 in.	6x10 in.	6x10 in.
900	6x8	6x8	6x10	6x10	8x10
1050	6x8	6x10	8x10	8x10	8x12
1200	6x10	8x10	8x10	8x10	8x12
1350	6x10	8x10	8x10	8x12	10x12
1500	8x10	8x10	8x12	10x12	10x12
1650	8x10	8x12	10x12	10x12	10x14
1800	8x10	8x12	10x12	10x12	10x14
1950	8x12	10x12	10x12	10x14	12x14
2100	8x12	10x12	10x14	10x14	12x14
2250	10x12	10x12	10x14	12x14	12x14
2400	10x12	10x14	10x14	12x14	
2550	10x12	10x14	12x14	12x14	
2700	10x12	10x14	12x14		
2850	10x14	12x14	12x14		
3000	10x14	12x14			
3150	10x14	12x14			
3300	12x14	12x14			

The 6-in. girder is figured as being made with three pieces 2 in. dressed to $1\frac{1}{2}$ in. thickness.

The 8-in. girder is figured as being made with four pieces 2 in. dressed to $1\frac{1}{2}$ in. thickness.

The 10-in. girder is figured as being made with five pieces 2-in. dressed to $1\frac{1}{2}$ in. thickness.

The 12-in. girder is figured as being made with six pieces 2-in. dressed to $1\frac{1}{2}$ in. thickness.

Note—For solid girders multiply above loads by 1.130 when 6-in. girder is used; 1.150 when 8-in. girder is used; 1.170 when 10-in. girder is used and 1.180 when 12-in. girder is used.

Reference—Page 33, Bulletin No. 145, National Committee on Wood Utilization, U. S. Department of Commerce, "Light Frame House Construction."

Instructions for Determining Girder Sizes

First—Refer to diagram on page 19 and using it as a guide, determine for each floor the length of joist spans that are to be supported by the girder. For the first floor it is equal to one-half the total distance from center line of girder measured both ways to the next girder, basement bearing partition or foundation wall, except when joists are continuous over this girder and broken over nearest support on each side, in which case it is equal to $\frac{1}{2}$ this total distance. Use the same method for second and third floors and roof when part of that weight is to be supported by the girder through the bearing partition, struts, etc. In the case illustrated in diagram on page 19, it is equal to 12 feet for all three floors and 18 feet for the roof.

Second—Multiply the load per square foot, as indicated on

the chart, for each of these floors and roof by the various spans, including 20 lbs. per square foot of floor area for first and second story partitions. (In this case it is 2880 lbs.)

(First Floor plus partitions.....70 lbs. \times 12 ft.— 840 lbs.)
 (Second Floor plus partitions.....80 lbs. \times 12 ft.— 960 lbs.)
 (Attic Floor, not floored.....30 lbs. \times 12 ft.— 360 lbs.)
 (Roof40 lbs. \times 18 ft.— 720 lbs.)
 (Total2880 lbs.)

The total represents the load to be supported by the girder for each foot of its length.

Third—Determine length of girder span (distance between columns).

Fourth—Refer to table, read down in column at left to load already determined—then across to column corresponding to length of span to be provided for, the figure at this intersection represents the size of girder required.

WOOD JOISTS

SIZES OF JOISTS FOR VARIOUS SPANS AND LOADS JOISTS SPACED 16 IN. O. C. UNIFORMLY LOADED

Based on Use of 4-SQUARE Guide-Line FRAMING

(Plastered Ceiling Below—Deflection not over 1/360 of Span)

Allowable Fiber Stress for Douglas Fir—1200 lbs. per sq. in. Modulus of Elasticity, 1,600,000

Allowable Fiber Stress for W. Coast Hemlock—1040 lbs. per sq. in. Modulus of Elasticity, 1,400,000

Length of Span	Live Load in Pounds per Square Foot of Floor Area									
	10 lbs.		20 lbs.		30 lbs.		40 lbs.		50 lbs.	
	Nominal Size of Joist Required									
	Douglas Fir	W. Coast Hemlock	Douglas Fir	W. Coast Hemlock	Douglas Fir	W. Coast Hemlock	Douglas Fir	W. Coast Hemlock	Douglas Fir	W. Coast Hemlock
8' or less	2x6 in.	2x6 in.	2x6 in.	2x6 in.	2x6 in.	2x6 in.	2x6 in.	2x6 in.	2x6 in.	2x6 in.
8'-6"	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x8
9'-0"	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x8	2x8	2x8
9'-6"	2x6	2x6	2x6	2x6	2x6	2x8	2x8	2x8	2x8	2x8
10'-0"	2x6	2x6	2x6	2x6	2x8	2x8	2x8	2x8	2x8	2x8
10'-6"	2x6	2x6	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8
11'-0"	2x6	2x6	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8
11'-6"	2x6	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x10
12'-0"	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x10	2x10	2x10
12'-6"	2x8	2x8	2x8	2x8	2x8	2x10	2x10	2x10	2x10	2x10
13'-0"	2x8	2x8	2x8	2x8	2x10	2x10	2x10	2x10	2x10	2x10
13'-6"	2x8	2x8	2x8	2x10	2x10	2x10	2x10	2x10	2x10	2x10
14'-0"	2x8	2x8	2x10	2x10	2x10	2x10	2x10	2x10	2x10	2x12
14'-6"	2x8	2x8	2x10	2x10	2x10	2x10	2x10	2x10	2x10	2x12
15'-0"	2x8	2x10	2x10	2x10	2x10	2x10	2x10	2x12	2x12	2x12
15'-6"	2x10	2x10	2x10	2x10	2x10	2x10	2x12	2x12	2x12	2x12
16'-0"	2x10	2x10	2x10	2x10	2x10	2x12	2x12	2x12	2x12	2x12
16'-6"	2x10	2x10	2x10	2x10	2x12	2x12	2x12	2x12	2x12	2x12
17'-0"	2x10	2x10	2x10	2x12	2x12	2x12	2x12	2x12	2x12	2x12
17'-6"	2x10	2x10	2x10	2x12	2x12	2x12	2x12	2x12	2x12	2x12
18'-0"	2x10	2x10	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12
18'-6"	2x10	2x10	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12
19'-0"	2x10	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12
19'-6"	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12
20'-0"	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12

Note—2x4 in. Douglas Fir may be used for ceiling joist (having no live load) up to 10-ft. spans. 2x4-in. West Coast Hemlock may be used for ceiling joist (having no live load) up to 9 ft. 6-in. spans.

Reference—Page 57, Bulletin No. 145, National Committee on Wood Utilization, U. S. Department of Commerce, "Light Frame House Construction."

Note—2x4 in. Douglas Fir may be used for ceiling joist (having no live load) up to 10-ft. spans. 2x4 in. West Coast Hemlock may be used for ceiling joist (having no live load) up to 9 ft. 6-in. spans.

Reference—Page 57, Bulletin No. 145, National Committee on Wood Utilization, U. S. Department of Commerce, "Light Frame House Construction."

Instructions for Figuring Joist Sizes

First—Determine maximum joist span for each floor.

Second—Determine amount of live load to be provided for from local Building Code (usually this is 40 lbs. per square foot for all floors used for living purposes and 20 lbs. for attic floors, used for light storage).

Third—Refer to table. Read down in column at left to the length of span already determined—then across to the column corresponding to live load to be provided for and species of wood to be used. The figure at this intersection represents the size of joists required.

WOOD RAFTERS

Instructions for Figuring Rafter Sizes

First—Determine length of rafter span by measuring distance from plate up to next support. This can be a partition or strut brace extending up from a partition provided these struts are set not to exceed 4 feet apart and are capped with a plate set on edge. The presence of collar beams will permit increasing the span but should not be considered as a support.

Second—Determine amount of live load that shall be provided for from local Building Code—usually this is 30 lbs. per square foot of horizontal surface.

Third—Refer to table of rafter sizes. Read down in column at left to length of span—then across to column corresponding to live load that must be provided for and species of wood to be used. The figure at this intersection represents the size of rafter required.

4-SQUARE Guide-Line FRAMING

SIZES OF RAFTERS FOR VARIOUS SPANS AND LOADS

Rafters Uniformly Loaded—Slope of 20° or More—Spaced 16 in. O. C.—Not Plastered
Based on Use of 4-SQUARE Guide-Line FRAMING

Span—Unsupported Lengths from Plate to Ridge—Without Collar Beams

Length of Span	Live Load in Pounds per Square Foot of Roof Area							
	15 lbs.		20 lbs.		30 lbs.		40 lbs.	
	Nominal Size of Rafters Required							
	Douglas Fir	W. Coast Hemlock	Douglas Fir	W. Coast Hemlock	Douglas Fir	W. Coast Hemlock	Douglas Fir	W. Coast Hemlock
7' or less	2x4 in.	2x4 in.	2x4 in.	2x4 in.	2x4 in.	2x4 in.	2x6 in.	2x6 in.
7'-6"	2x4	2x4	2x4	2x4	2x4	2x6	2x6	2x6
8'-0"	2x4	2x4	2x4	2x4	2x6	2x6	2x6	2x6
8'-6"	2x4	2x4	2x4	2x4	2x6	2x6	2x6	2x6
9'-0"	2x4	2x4	2x4	2x6	2x6	2x6	2x6	2x6
9'-6"	2x4	2x6	2x6	2x6	2x6	2x6	2x6	2x6
10'-0"	2x4	2x6	2x6	2x6	2x6	2x6	2x6	2x6
10'-6"	2x6	2x6	2x6	2x6	2x6	2x6	2x8	2x8
11'-0"	2x6	2x6	2x6	2x6	2x6	2x6	2x8	2x8
11'-6"	2x6	2x6	2x6	2x6	2x6	2x8	2x8	2x8
12'-0"	2x6	2x6	2x6	2x6	2x8	2x8	2x8	2x8
12'-6"	2x6	2x6	2x6	2x6	2x8	2x8	2x8	2x8
13'-0"	2x6	2x6	2x6	2x8	2x8	2x8	2x8	2x8
13'-6"	2x6	2x6	2x6	2x8	2x8	2x8	2x8	2x8
14'-0"	2x6	2x6	2x8	2x8	2x8	2x8	2x8	2x8
14'-6"	2x6	2x8	2x8	2x8	2x8	2x8	2x8	2x8
15'-0"	2x6	2x8	2x8	2x8	2x8	2x8	2x8	2x8
15'-6"	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8
16'-0"	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8
16'-6"	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8
17'-0"	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8
17'-6"	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8
18'-0"	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8

Note—Allowable fiber stress for Douglas Fir—1200 lbs. per sq. in.

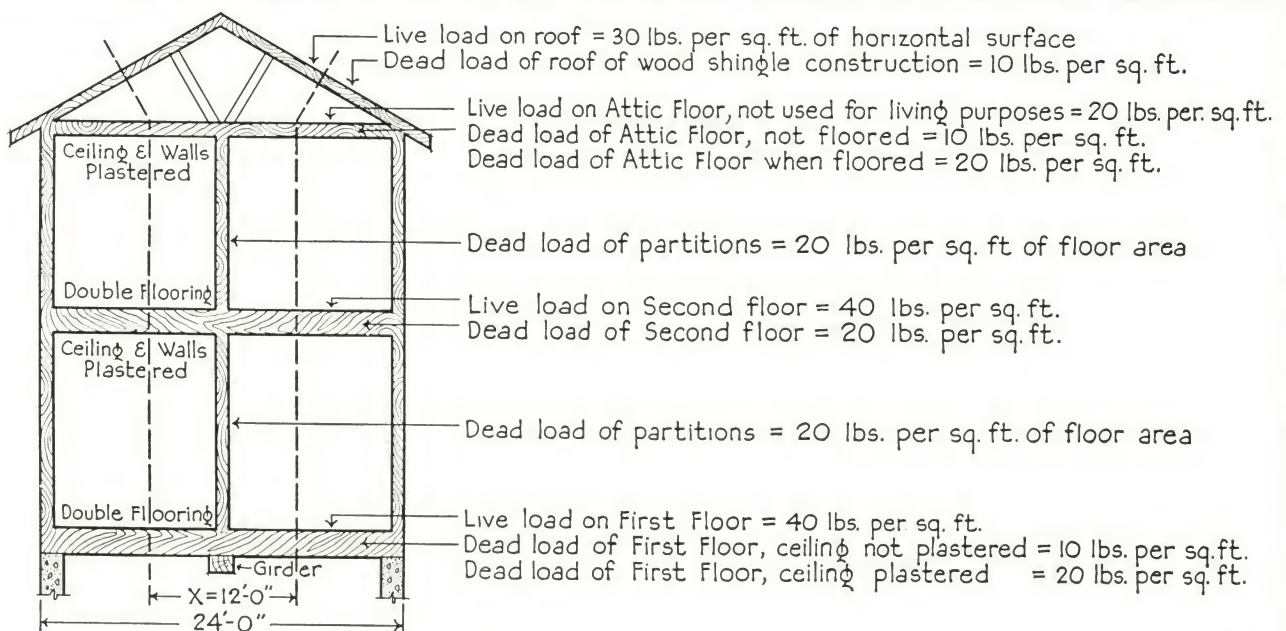
Allowable fiber stress for West Coast Hemlock—1040 lbs. per sq. in.

These figures provide for Dead Loads as follows: Weight of Rafters; Weight of Roof Sheathing (2.5 lbs. per sq. ft.); Weight of Roof Covering (2.5 lbs. per sq. ft.).

This roof covering will provide for wood shingles, metal sheets, metal tile or composition roofing. If heavier material is used, make the necessary allowance by using figures for a proportionately heavier live load.

Reference—Pages 19, 20, 21 and 22—"Maximum Spans for Joists and Rafters" by National Lumber Manufacturers' Association.

DIAGRAM SHOWING METHOD OF FIGURING LOADS FOR HOUSE FRAMING





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